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COMMONWEALTH BUREAU OF ANIMAL HEALTH

THE

# VETERINARY BULLETIN

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## DISEASES CAUSED BY BACTERIA AND FUNGI

McDiarmid, A. (1947.) **The carriage of Staphylococcus aureus in the milk and on the teats of normal cows.**—*Vet. Rec.* **59.** 11–12. **855**

Using 39 cows all free from infection with *Streptococcus agalactiae*, 449 milk samples and 449 teat swabs were examined for the presence of *Staph. aureus* over a period of 24 weeks. It was concluded that *Staph. aureus* is commonly present in the milk or on the surface of the teats of normal dairy cows. Carriage is generally intermittent but there are occasional persistent carriers.—M. C.

Thaysen, E. H. (1948.) **Differentiation of beta staphylolysin in two antigenically different components.**—*Acta path. microbiol. scand.* **25.** 529–539. [In English. Author's summary slightly amended.] **856**

In filtrates of staphylococcus cultures originating from furunculosis in dogs, a lysin of characteristic $\beta$ type ($\beta_2$) was demonstrated. In its antigenic properties and its specific dose-time curve this lysin differs from the $\beta_1$ lysin. Both lysins were present together in the ordinary $\beta$-toxic filtrates examined so far. Normal dog serum contains relatively large amounts of $\beta$ antilysin. A provisional $\beta_2$ unit is defined.

Hjärre, A. (1948.) Kontagiös pyodermi hos svin. (*Impetigo contagiosa.*) [**Contagious pyodermia in swine.** (*Impetigo contagiosa.*)]—*Skand. VetTidskr.* **38.** 662–682. [Abst. from English summary.] **857**

The author describes, clinically and morphologically, benign suppurative skin diseases in pigs, caused by staphylococcal or streptococcal infections of small cutaneous lesions. The disease chiefly affects young pigs during the warm season. Contagious pyodermias in swine are sometimes described under such names as "Ferkelruss", "multiple crustous eczema", "pitch scab", etc.

Rajagopalan, V. R., & Israil, M. (1945.) **Streptococci from equine strangles in India.**—*Indian J. vet. Sci.* **15.** 43–47. **858**

Thirty-nine strains of streptococci, including 17 isolated in India from abscesses or nasal swabs, were examined using the methods of Bazeley & Battle [*V. B.* **11.** 738]. All belonged to group C. One was *Str. equi*; 12 belonged to Type 4; two to Type 2 and the other two were variants of Type 2. The small proportion of *Str. equi* calls for comment and a detailed study.—K. C. Sinha.

Saslaw, S., & Doan, C. A. (1947.) **The role of phagocytosis in resistance, as related to age of granulocytes following primary and reinfection studies with hemolytic streptococci in** *Macacus rhesus.*—*J. Lab. clin. Med.* **32.** 878–885. **859**

An immediate granulocytic leucocytosis had been shown in monkeys following primary intranasal infection with Group C haemolytic streptococci. Re-infection failed to elicit such a response.

Opsonic indices were determined, and the age of the granulocytes was estimated by means of the Arneth-Schilling maturity index. Following primary infection the opsonic index rose to 8. Following re-inoculation three months later opsonic indices of 13·5–25 were obtained. The degree of total phagocytosis in re-infection was only slightly higher than in primary infection. In the latter case there was a leucocytosis, the opsonic index remaining low, while re-infection produced no leucocytosis but increased phagocytosis per individual cell. It was apparent that the lower the opsonic index the greater the number of granulocytes required to control a given infection. The findings suggest the acquisition of a specific humoral catalyst facilitating phagocytosis, fewer granulocytes being necessary on re-infection than on primary infection. The younger mature cells (one-, two-, and three-lobed) had the greatest phagocytic activity, the capacity decreasing with age.—Clive Briggs.

Stevenson, W. G., & Clark, W. (1948.) **The incidence of Streptococcus agalactiae in a commercial dairy herd before and after treatment with penicillin.**—*Canad. J. comp. Med.* **12.** 237–238. **860**

In a herd of 18 cows which were milked by machine, sanitary precautions being observed in

an indifferent manner, 40 of 72 quarters were found to be harbouring streptococci. Infected quarters were treated with bougies each of which contained 25,000 I.U. of amorphous calcium penicillin, a bougie being inserted into each infected quarter immediately after the morning and evening milking for three days. Fifty-three days after treatment the animals were retested, 21 of the 40 penicillin treated quarters were free from streptococci, but nine of the untreated quarters had become infected.—THOMAS MOORE.

GRINNELLS, C. D. (1947.) **Bovine mastitis.**—*Auburn Vet.* **3.** 58–59, & 82–83. **861**

A note on bovine mastitis together with survey figures indicating the prevalence of the disease in certain states of the U.S.A. Control is discussed.—CLIVE BRIGGS.

ALLENDORF, R. (1944.) Ueber die Ursachen der Streptokokken-Infektionen des Euters der Rinder. **[The aetiology of streptococcal infection of the bovine udder.]**—*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* July 21st. 236–237. **862**

A general discussion on the subject, much of it dealing with the publications of certain authors, whose work is well known.

The author states that he was able to make a tentative diagnosis of mastitis by the appearance of the faeces. He states that on "large farms" on which the cattle are fed on unsuitable food, excess of concentrates, badly saved and unsuitable roughage, gastro-intestinal disturbance occurs, as a result of which streptococci and other bacteria reach parenteral situations in the body.

He refers to high incidence of mastitis in cows with foot and mouth disease and in cows infected with *Brucella abortus*. The author is of the opinion that in the treatment of mastitis diet is of great importance.—P. SASSE.

AULD, W. C., & PARKER, E. (1947.) **An outbreak of acute mastitis due to *Streptococcus faecalis*.**—*Vet. Rec.* **59.** 281–282. **863**

In a herd consisting mainly of first calf heifers, on pasture and machine milked, an acute outbreak of mastitis affecting 11 animals occurred within a period of five days. A streptococcus identified as *Str. faecalis* was isolated from the affected animals and also from three other animals in the herd which did not have symptoms.

Treatment with mastitis serum, sulphanilamide and penicillin gave satisfactory results. Two of the cases relapsed on the eleventh day. —M. C.

BENSON, D. V. (1947.) **Treatment of bovine mastitis with tyrothricin, bacitracin, streptomycin, and penicillin.**—*J. Amer. vet. med. Ass.* **111.** 289–294. **864**

B. compared the efficacy of the four drugs used either alone or in succession, and any adverse effects, on the udder tissue and milk secretion.

In tests with tyrothricin [the name given to the bactericidal agent containing both gramicidin and tyrocidine] the cows were divided into two groups. In group one each infected quarter was infused with 20 ml. of tyrothricin (2 mg. per ml. of gramicidin and tyrocidine in a 50% oil emulsion) and in each infected quarter of the second group 40 ml. of tyrothricin were infused. A total of 79 quarters infected with *Str. agalactiae* was treated. 16·1% of quarters with slight and 39·6% of quarters with no induration were freed from infection. No quarters with marked and only two with distinct induration were freed from the infection. In some cases there was an increase in the viscosity of the milk and quarters were swollen as a result of the treatment, but there was no actual loss in milk production. Treatment was effective, but its application was limited by the changes brought about in the milk and udder tissue.

Only cases of *Str. agalactiae* mastitis were treated with bacitracin. The unit dose given was approximately one-tenth of that which would have been used in the case of penicillin. Twenty-eight quarters were infused, in 23 of which there was some induration. Four quarters were freed from infection for 28 days or longer following treatment and 16 quarters for 1–21 days. No disturbance of milk flow, toxic symptoms or swelling of the udders was observed.

A case of *Bact. coli* mastitis with some induration which had failed to respond to penicillin therapy was treated with streptomycin. Two infusions each of 500,000 units in 80 ml. of sterile distilled water were given at a 12-hour interval. Thereafter the quarter remained free from infection for an observed period of over two months. No adverse effects were produced.

Penicillin proved to be the most satisfactory agent for *Str. agalactiae* mastitis and produced no undesirable sequelae. Where several small doses of the drug had failed to free a quarter from infection, larger doses given later frequently achieved this result. All the quarters which failed to respond to 300,000–400,000 units of penicillin had extensive induration.

During the course of the experiments the number of cows in the herd with mastitis was reduced from 61 to seven. With all the antibiotic drugs there was a much greater efficacy in the treatment of non-indurated quarters.—C. B.

NEWSHOLME, C. M., & STEWART, J. (1947.) **Experiment on treatment of mastitis in buffaloes with penicillin.**—*J. R. Army vet. Cps.* **18.** 132–133. **865**

Thirty buffaloes with mastitis on two military farms in India were treated by intramammary injections of penicillin; at five consecutive milkings the affected quarter was stripped and 20,000 Oxford units of penicillin in 50–100 ml. of neutral double-distilled water introduced *via* the teat canal. Cases of streptococcal and staphylococcal mastitis and also of mixed infections of streptococci and staphylococci were treated successfully and of a total of 34 diseased quarters treated, all but five were cured. In cases in which the first course of penicillin failed to cure there appeared to be no advantage in increasing the dosage or prolonging the treatment.—C. Briggs.

Meara, P. J., & Mowat, I. (1947.) **A survey of bovine mastitis in dairy herds supplying milk to the Witwatersrand area.**—*J. S. Afr. vet. med. Ass.* **18.** 129–133. **866**

Samples of market milk were examined by the Breed smear technique and between 20·5% and 48·4% of the samples examined each month were mastitis-contaminated.

Samples from 368 dairy cows exposed for sale at the Johannesburg market were also examined and 39% were found to be infected.—M. C.

Johnson, S. D. (1947.) **Raising heifer calves on mastitis milk.**—*J. Amer. vet. med. Ass.* **110.** 179–182. **867**

Twelve heifer calves were pail-fed with milk from infected cows. When they came into lactation *Str. agalactiae* was not present in any of them, but ten quarters were permanently infected with haemolytic staphylococci. Three of the heifers became infected with *Str. agalactiae* during their first lactation.

One hundred and fifty heifer calves were reared on nurse cows, some of which had infected udders. Nine of these calves subsequently calved and 15 due to calve within a month had healthy udders.—M. C.

Bull, L. B., Murname, D., Munch-Petersen, E., Vasey, G. H., & Atkinson, T. H. (1946.) **Symposium on "Mastitis of Dairy Cattle".**—*Aust. J. Dairy Tech.* **1.** 18–23. Discussion pp. 23–24. **868**

The general problem of mastitis is discussed with particular reference to the common types due to streptococci and staphylococci. It is emphasized that the treatment of clinical cases of mastitis in a herd is not an efficient means of control because of the existence of subclinical cases. Even an attempt to develop a mastitis-free herd from unmated heifers in an isolated environment failed. Attention is drawn to the necessity for avoiding excessive vacuum pressures in milking machines because of the danger of injury to the udder. Speed in milking is thought to be a general essential to take advantage of the physiological "let-down" of milk from the alveoli, other essentials being contentment of the cow, non-injury of the teats and hygienic methods.

The symptoms of acute mastitis are described and treatments recommended. Although considerable reduction in yield occurs in cows affected with mastitis the effect of the disease on the quality of butter and cheese is uncertain and does not always appear to be detrimental.

Some general recommendations on mastitis control are given.—D. C. Blood.

Slavin, D. (1948.) **A simple method of identifying** *Streptococcus agalactiae.*—*J. comp. Path.* **58.** 161–166. **869**

A thousand strains of milk streptococci were examined in a composite medium containing sodium hippurate, aesculin and arginine monohydrochloride. *Streptococcus agalactiae* strongly hydrolyses both hippurate and arginine and never splits aesculin. Only one exception to this rule was found among the strains examined. S. therefore believes that the hippurate- aesculin-arginine test is a valuable method in the diagnosis of *Streptococcus agalactiae* although it cannot replace the serological methods.—E. K.-N.

McEwen, A. D., & Samuel, J. McA. (1946.) **The experimental bacterial contamination of the inner structure of the teats and the milk of cows.**—*Vet. Rec.* **58.** 485–487. **870**

The literature dealing with attempts to set up mastitis by exposing the outside of the teats to infective material is briefly discussed.

Experiments were made on cows at the abattoir to determine whether contaminations of the teat duct, the teat cistern or the milk could be demonstrated in teats exposed to bacterial infection from without. A strain of *Bact. coli* designated M.I. was used. Before exposure quarter samples were collected for bacteriological examination. Shortly after contaminating the teats with *B. coli* the cows were slaughtered. The milk, scrapings from the internal orifice of the teat duct and of the mucous membrane of the teat cistern were examined for *B. coli* M.I. The technique used in collecting the samples is described and check experiments indicated that the technique prevented accidental contamination. When the cows were not milked between the time of contamination and of slaughter *B. coli* could not be recovered from the milk, inner teat orifice or teat cistern.

The procedure was varied by drawing some milk from each quarter and then immersing the teats in a culture, by milking out with the teat and the hand both moistened with culture, by milking with the teat immersed in culture and by stripping with the teat immersed in culture.

Tests on similar lines were made with machine milking instead of hand milking.

The results indicated that contamination of the inside of cows' teats occurred in many cases when the outside of the teats was exposed to heavy bacterial contamination during either hand or machine milking.

The bearing of these findings on experimental production of mastitis is discussed.—M. C.

McEwen, A. D., & Cooper, M. B. (1947.) **Bovine mastitis.**—*Vet. Rec.* **59.** 655–664. **871**

This is an account of observations over a period of 14 months on a large dairy herd which was free from tuberculosis and from contagious abortion and was housed in a large modern building. The fore milk of each quarter was examined daily for clots. Quarter samples from each quarter were examined bacteriologically at intervals of not longer than three weeks. A total cell count of each sample was also made. The very numerous observations are tabulated and discussed in respect of the relation of the cell count to the presence of clots and bacteria in the milk; possible contributory factors; eradication of mastitis, management and hygiene; immunization and chemotherapy.

The article, dealing as it does with a great number of observations, does not lend itself to abstracting; it provides a record of precise observations which merits careful study and indicates lines on which further research is required.

In the summary the difficulty of defining what constitutes mastitis is pointed out and the importance of the corynebacteria as a factor in causation is stressed; while they may not be associated with many cases of clinical mastitis they may be responsible for an increased cell count and so are indicative of at least a mild inflammatory reaction in the udder. Cows classified as " easy milkers " had a higher incidence of mastitis than those classified as " hard milkers ". Management and hygiene have not been shown to exert any appreciable effect on incidence of mastitis. Chemotherapy at present holds out the best chance of mitigating losses. Eradication of *Str. agalactiae* from a herd is scientifically sound, but its successful adoption depends on economic factors. The eradication of other types of infection is not considered to be practicable.—M. C.

Packer, R. A. (1947.) **Incidence of the various mastitis organisms in Iowa.**—*N. Amer. Vet.* **28.** 591–592. **872**

Of 2,296 milk samples submitted to the Department of Veterinary Hygiene, Iowa State College, by 60 practising veterinarians of Iowa, 791 (34·4%) contained mastitis organisms. Details are given of the methods used in the bacteriological examination of the samples, together with a list of the positive samples arranged according to the species of organism concerned. The findings are discussed with particular reference to the relative incidence of staphylococci.—C. Briggs.

Coles, E. H. (1948.) **The sensitivity of bacteria of animal origin to streptomycin.**—*Amer. J. vet. Res.* **9.** 152–156. **873**

The effectiveness of streptomycin was determined both *in vitro* and *in vivo*, using mice as test animals, against various animal pathogens. Details are given of the wide range of relative susceptibility of 29 species of bacteria.

*Bacillus anthracis*, *Brucella abortus*, *Br. suis*, *Br. melitensis*, *Pasteurella hemolytica*, *Past. septica* (*Past. multocida*), *Corynebacterium renale*, *C. pyogenes*, *Staph. aureus*, *Proteus ammoniae*, *Listeria monocytogenes*, and *Aerobacter aerogenes* were found to be most sensitive to streptomycin. Streptococci, salmonella and a few strains of corynebacteria were relatively resistant.

It was shown in work with *Past. septica*, *C. pyogenes* and *Staph. aureus* that different strains of the same species may vary greatly in their resistance to streptomycin. In general, Gram-negative bacteria were more sensitive than Gram-positive species, but *B. anthracis*, *Staph. aureus* and *L. monocytogenes* were notable exceptions. Three cultures of *B. anthracis* were extremely sensitive to streptomycin.—Clive Briggs.

Thompson, R. T. (1948.) **Antihyaluronidase antagonistic to pneumococcus hyaluronidase in the serum of normal human beings and patients with pneumococcic pneumonia: rise of titer in bacteremic pneumococcic pneumonia.**—*J. Lab. clin. Med.* **33.** 919–932. [Author's summary copied *verbatim*.] **874**

Antihyaluronidase in the serum of fifty normal human beings antagonistic to Type 2 pneumococcus hyaluronidase was compared with the same antihyaluronidase in the serum of Patient A. T. who was six months convalescent from Type 2 pneumococcus endocarditis. All of the fifty normal subjects tested had some degree of this antihyaluronidase. Since subsequent experiments demonstrated that serum antihyaluronidase antagonistic to pneumococcus hyaluronidase is not type specific, these observations upon the sera of normal human beings pertain to hyaluronidase elaborated by all types of pneumococci.

Serial sera of twenty-six patients with primary pneumococcic pneumonia were tested for antihyaluronidase by titration against hyaluronidases in culture filtrates of Type 1, Type 2, and Type 7 pneumococci. Seven patients with negative blood culture and no purulent complica-

tion exhibited no change of antihyaluronidase titer. Eight of eleven patients with pneumococcus bacteremia and no purulent complication exhibited rises of antihyaluronidase titer which were fourfold or greater. All of eight patients with pneumococcus bacteremia and purulent complication exhibited rises of titer of fourfold or greater. The rises of antihyaluronidase titer which were observed were not specific for pneumococcus type.

Therapeutic antipneumococcic rabbit serum exhibited less antagonism of pneumococcus hyaluronidase than did a majority of the sera from fifty normal human beings. High therapeutic concentrations of penicillin and sodium sulfadiazine exhibited no antagonism of pneumococcus hyaluronidase.

A rise of serum antihyaluronidase titer could not be brought about in one patient with pneumococcic pneumonia by the intravenous administration of therapeutic antipneumococcic serum, but a progressive rise of serum agglutinin titer for the homologous pneumococcus was produced.

ANON. (1948.) **Primary tuberculosis of the udder and uterus in attested herds.**—*Vet. Rec.* **60.** 377–378. **875**

This is a contribution sent from the Veterinary Laboratory, Ministry of Agriculture, Weybridge.

During the years 1943/7, inclusive, the following were the figures annually of the number of cases of primary tuberculosis of the udder diagnosed in attested herds in England, Wales and Scotland :– 22, 27, 20, 8, 33, and on inquiry it was found that of the cases that occurred in each of these years, there was the history of previous treatment of the udder in 91%, 89%, 95%, 87·5% and 88% respectively. Comparable figures are given for 1948 for England alone where 28 cases were found, all of which had been given previous udder treatment.

A note is inserted as a warning of the danger of producing tuberculosis of the udder or uterus in the course of giving mammary or uterine treatment, unless all possible means of precaution against the introduction of infection are taken.

GRAÜB, E., SAXER, E., & VONARBURG, H. (1946.) Beobachtungen über den Einfluss der Brucella-Infektion auf die Tuberkulose beim Rinde. **[Effect of brucella infection on bovine tuberculosis.]**—*Schweiz. Zeitschr. Path. Bakt.* **9.** 180–192. [English, French & Italian summaries. Abst. from English summary.] **876**

Four pregnant cows were twice vaccinated with a TB. strain of low virulence (strain P). Two of the cows subsequently resisted inoculation with a strain highly virulent for cattle. The two other cows which had been excreting *Br. abortus* in their milk developed tuberculous mastitis. The observation is considered to support the view that brucella infection of the udder predisposes to tuberculosis of the udder.

METAXAS, M. N., & METAXAS-BÜHLER, M. (1948.) **Passive transfer of local cutaneous hypersensitivity to tuberculin.**—*Proc. Soc. exp. Biol., N.Y.* **69.** 163–165. **877**

The method of local passive sensitization can be applied to the cellular transfer of tuberculin hypersensitivity discovered by Chase (1945).

G. pigs of 550–959 g. were inoculated with a virulent human strain of *Mycobact. tuberculosis* and tested intradermally with O.T. three and a half to seven weeks later. Those which gave the strongest reactions were selected as cell-donors. Each experiment was made with two tuberculous and two normal donors. The four animals received 30 ml. of liquid paraffin intraperitoneally and 48 hours later were killed. The peritoneal cavities were washed out with heparinized Tyrode solution. The cells in the washings were recovered by centrifuging and washed three times in Tyrode's solution. Finally they were made up as a thick suspension, the cell volume of which was usually about 40%, determined by "packing" in a capillary tube.

The cell suspensions were inoculated in a dose of 0·1 ml. intradermally to groups of 3–5 albino g. pigs weighing 250–400 g., the tuberculous and the control cells in opposite flanks. The injection caused a marked reaction which, after 48 hours, consisted of a moderately-indurated area of erythema 5–9 mm. in diameter with a yellowish centre rarely more than 0·1 mm. in diameter.

Tuberculin tests were made at this time either by giving 0·1 ml. of O.T. diluted 1 : 10 into the prepared sites or by injecting 1–1·5 ml. of O.T. diluted 1 : 1 with saline subcutaneously or intra-peritoneally. In both cases the results were clear cut.—J. RICHARD HUDSON.

LALL, H. K. (1946.) **Tuberculin testing in buffaloes with a description of some differences in the macroscopic lesions of the cow and the buffalo.**—*Indian J. vet. Sci.* **16.** 24–26. **878**

Buffalo tuberculosis is not uncommon in the Punjab. In reactors the local oedema is more extensive than in zebu cattle. Details are given of the lesions found in one buffalo that was examined P.M.—F. C. MINETT.

—. (1946.) **Buffalo's milk and tuberculosis.**—*Brit. med. J.* Nov. 23rd. 802. **879**

This is a reply to a question regarding the safety of buffaloe's milk from the point of view of TB. Experimental inoculation of buffaloes does not indicate that they are any less susceptible than ordinary cattle. Such information as is

available suggests that in most parts of the world the incidence of TB. in buffaloes is very low. In Egypt, however, it is reported that infection is common: some 60% of buffaloes slaughtered in the Alexandria abattoir in 1937 are reported to have had macroscopic lesions of the disease.

—M. C.

LEWIS-JONSSON, J. (1946.) **The transmission of tuberculosis from cats to human beings. Report of a case.**—*Acta tuberc. scand.* **20.** 102–105. [In English. Author's summary slightly amended.] **880**

A previously healthy three-year-old boy was bitten on the forearm by a tuberculous cat, which was found dead two days later. The pin-point wounds first healed, but after an incubation period of at most 23 days, infiltration and, later, sores developed at the site of the bite, while adenitis appeared in the right coronoid fossa and the right axilla, and the lungs became the site of miliary changes. The tuberculin test gave a positive reaction. The patient died three and a half months after the bite, and autopsy revealed general tuberculosis originating at the site of the bite. Injections of parts of organs which contained tubercle bacilli of the bovine type into a rabbit caused death of the animal from general tuberculosis.

ZARGAR, S. L. (1946.) **An outbreak of tuberculosis in ducks.**—*Indian J. vet. Sci.* **16.** 26–27. **881**

Five hundred ducks were purchased for a duck farm from villages in the Central Provinces, after which cases of TB. began to appear in young ducks. There were progressive emaciation, great loss of weight, and lameness. Out of 33 cases examined, the liver was affected in 32, the spleen in 27, the intestine in 14, the lungs in five, while seven had ascites. Diagnosis was by microscopical examination. Tuberculin testing was unsatisfactory.—F. C. MINETT.

DUBOS, R. J., & PIERCE, C. (1948.) **The effect of diet on experimental tuberculosis of mice.**—*Amer. Rev. Tuberc.* **57.** 287–293. [Spanish summary, authors' summary copied *verbatim.*] **882**

The survival time of mice infected with mammalian tubercle bacilli is markedly affected by the composition of the diets fed to the animals during the course of the experiment. Of the diets tested, a mixture of whole wheat and dried milk was the most favorable for resistance to infection, and a mixture of cornmeal and butter the most unfavorable. The differences could be recognized with several strains of mice whatever the infective dose, and the route of infection used for the infection test.

FEINSTONE, W. H., FRIEDMAN, H. L., ROTHLAUF, M. V., KELLY, A. M., & WILLIAMS, R. D. (1947.) **Studies in chemotherapy of tuberculosis. II. Activity *in vitro* of a related series of ethers and arylamines.**—*J. Pharmacol.* **89.** 153–166. **883**

2-butoxy-5-aminopyridine has a marked specific bacteriostatic action on mycobacteria. Isosteres [substances having analogous electronic arrangement] retain almost all the activity of the parent compound. Cyclic substitutions in the alkoxy linkage reduce activity. In general, only specific isomers are active. Nuclear substitutions produce diminished activity.—W. R. BETT.

FETHKE, N., & ANDERSON, R. J. (1948.) **Chemistry of the lipids of tubercle bacilli. LXXIV. A contribution to the study of acid-fastness of acid-fast bacilli.**—*Amer. Rev. Tuberc.* **57.** 294–305. [Spanish summary, authors' summary copied *verbatim.*] **884**

Ordinary chemical compounds of known constitution, such as hydrocarbons, higher normal fatty acids, esters, higher alcohols and hydroxy acids, are not acid-fast. The only acid-fast substance that we have been able to isolate from extracts of the human tubercle bacillus is mycolic acid. Analogous hydroxy acids, namely the bovine, avian and phleimycolic acids and leprosinic acid, are also acid-fast. Derivatives of the mycolic acids in which the hydroxyl group is combined, as acetyl or iodo derivatives, are acid-fast. The methyl esters of the mycolic acids are not acid-fast. The free carboxyl group of the mycolic acids appears to be essential for acid-fastness.

FREMONT-SMITH, P., & FAVOUR, C. B. (1948.) ***In vitro* lysis of leucocytes from tuberculous humans by tuberculoprotein.**—*Proc. Soc. exp. Biol., N.Y.* **67.** 502–504. **885**

Suspensions of human white cells were obtained by layering whole, heparinized blood over albumin-saline mixtures and centrifuging. The resulting suspensions consisted of 50–80% lymphocytes and 20–40% neutrophiles. Experiments were performed on the leucocytes from (1) tuberculin-positive (P.P.D.) patients with bacteriologically proven, active, severe tuberculosis; (2) subjects with positive tuberculin skin tests (P.P.D.) but no demonstrable clinical tuberculosis; (3) healthy persons with negative tuberculin skin tests (P.P.D., second strength). The observation that lymphocytes from animals infected with certain bacteria are specifically destroyed by contact *in vitro* with protein extracts of these bacteria is extended to human beings infected with *M. tuberculosis.* In these, as in the g. pig, the neutrophiles are also specifically lysed.—W. R. B.

FELDMAN, W. H., KARLSON, A. G., & HINSHAW, H. C. (1948.) **Streptomycin-resistant tubercle bacilli. Effects of resistance on therapeutic results in tuberculous guinea pigs.**—*Amer. Rev. Tuberc.* **57.** 162–174. [Spanish and English summaries, English summary and conclusions copied *verbatim.*] **886**

A study was done to determine if infections produced by tubercle bacilli having a marked *in vitro* resistance to streptomycin would respond to streptomycin therapy. Tubercle bacilli with a normal sensitivity to streptomycin were obtained from a patient before treatment with streptomycin was started. A culture, resistant to streptomycin *in vitro*, was obtained from the same patient after treatment for four months with streptomycin. Two experiments were done concurrently. In one, guinea pigs were infected with the sensitive culture and in the other experiment a similar group of guinea pigs were infected with the resistant culture. Twenty days after inoculation, treatment of 10 animals in each experiment with streptomycin was begun. Treatment was continued daily until all of the untreated controls had died (approximately twenty-three weeks).

The results showed that the disease in the animals infected with the streptomycin-sensitive culture responded favorably to treatment. However, in 3 of the 10 animals, active lesions of recent origin were present. Streptomycin-resistant tubercle bacilli were obtained from each of these 3 animals. The disease in the animals infected with the streptomycin-resistant culture failed to yield to treatment. In this instance the amount and character of the tuberculosis in the untreated controls and in the treated group were comparable.

It is concluded that infections in guinea pigs induced by tubercle bacilli resistant *in vitro* to streptomycin are refractory to treatment with this antibiotic.

SIEVERS, O. (1946.) **Experimental trials of p-Aminosalicylic acid (PAS) against various kinds of bacteria.**—*Svenska Läkartidn.* **43.** 2041. [Abst. in *Amer. Rev. Tuberc.* **55.** No. 6. p. 169 of absts. (1947), slightly modified. Signed: W. C. TOBIE.] **887**

*Mycobacterium tuberculosis* (from sputum or from pure cultures) was grown in bouillon sealed on microscope slides by a method modified from that of Pryce (1941). The average concentration of p-aminosalicylic (PAS) which inhibited growth during eight days' incubation in four experiments was 0·153 mg. per 100 cc. of bouillon ($10^{-5}$ molal), agreeing well with the results of Lehmann [see *V. B.* **18.** 40]. PAS did not modify the tuberculin reaction in guinea pigs. PAS was tested against 19 species (a total of 37 strains) of non-acid-fast bacteria (pathogenic and nonpathogenic) but there was no bacteriostasis with concentrations less than 1·25 to 2·50 per cent of PAS, at which concentrations, 13 strains gave no growth. PAS did not protect mice injected with pneumococci or with tetanus toxin.

ROBERTS, A. (1948.) **Modern methods of culturing *Mycobacterium tuberculosis*, with special reference to the Dubos technique.**—*Tubercle, Lond.* **29.** 97–100. **888**

The Dubos medium is by far the best for streptomycin sensitivity tests of the tubercle bacillus. The original formula and some of its modifications are given. Tween ["Tween," sometimes referred to as "Tween 80", is a surface-active (wetting) agent] albumin growths injected by the caudal vein produce extensive fatal pulmonary lesions in white mice in four weeks. If the organisms are mixed with organic material (egg yolk), infection is enhanced. Mice injected in this way die in two weeks. A new method of enhancing the growth of the tubercle bacillus utilizes citrated human blood lysed with equal parts of 1% saponin solution in water, to which glycerin is added to a concentration of 5%. References are appended to 15 articles giving the main theories and descriptions of techniques.

—W. R. BETT.

CORPER, H. J., COHN, M. L., & FREY, W. H. (1948.) **Submerged suspended liquid culture of *M. tuberculosis* and other acid-fast bacilli under the influence of physical and chemical factors.**—*Amer. Rev. Tuberc.* **58.** 215–229. **889**

The growth of tubercle bacilli was studied on various liquid and solid media. The authors succeeded in producing a "submerged sediment" culture by altering the specific gravity and viscosity of the medium. They advocate the use of a good solid medium for diagnostic purposes in preference to liquid media.—E. KLIENEBERGER-NOBEL.

FINLAYSON, M. K. (1946.) **Stimulation of the growth of mycobacteria by egg yolk.**—*J. Path. Bact.* **58.** 88–93. **890**

A simple yolk-enriched egg medium is described, suitable for routine laboratory use. On this medium the human type tubercle bacillus grew within 14 days, with full growth in 3–4 weeks; the bovine type appeared within 3–4 weeks, with full growth in 5–6 weeks. A growth stimulating factor is associated with the phosphatide fraction of the yolk, a crude phosphatide fraction and a commercial sample of purified lecithin being equal in potency.—W. R. BETT.

SEIBERT, F. B., & DUFOUR, E. (1948.) **A study of certain problems in the use of standard tuberculin. Fractionation of PPD, standardiza-**

**tion of tuberculins, and the question of sensitization.**—*Amer. Rev. Tuberc.* **58.** 363–374. [Authors' summary copied *verbatim.*] **891**

Progress in the purification of the active principle of tuberculin has been outlined. The method, including precipitation with ammonium sulfate at pH 7·0, yields a chemically more pure protein than the earlier trichloracetic acid precipitation method. The contents of nucleic acid and polysaccharide are much lower.

Furthermore, products of constant potency can apparently be prepared from the same strain of tubercle bacilli by this method, as three comparable lots have already been produced.

A product similarly made but from a bovine strain was more potent and one from an avian strain was less potent than the standard purified tuberculin, PPD-S.

Evidence has been presented from repeated double tests at three month intervals on a group of nurses to show that a cumulative sensitization due to the tuberculin protein itself does not occur. A fluctuation is evident, however, in the degree of reactivity from negative to positive and reverse, in those nurses whose sensitivity was so low that they reacted only to the second dose of 0·005 mg. PPD-S.

The standardization of tuberculins prepared in different ways is often difficult because their relative potencies may vary in individuals with different levels of sensitivity. This indicates the presence of a less specific fraction admixed with a more specific one. As support for this interpretation, such fractions have actually been isolated from raw tuberculin. These experiments predict the preparation of a more specific diagnostic reagent.

WENKLE, W. C., LOOMIS, R. N., & JARBOE, J. M. (1948.) **Chromogenic acid-fast bacilli. Their use in vaccination against tuberculosis in the guinea pig.**—*Amer. Rev. Tuberc.* **57.** 385–388. [Abst. from authors' summary.] **892**

G. pigs vaccinated with chromogenic acid-fast bacilli became hypersensitive to tuberculin after vaccination. When these vaccinated animals were infected with various doses of a virulent strain of human-type tubercle bacilli, a definite, but not complete, immunity was produced. Vaccinated g. pigs receiving a massive infecting dose developed more tuberculosis than did the controls receiving the same dose.

MACLEAN, P. D., LIEBOW, A. A., & ROSENBERG, A. A. (1946.) **A hemolytic corynebacterium resembling** *Corynebacterium ovis* **and** *Corynebacterium pyogenes* **in man.**—*J. infect. Dis.* **79.** 69–90. **893**

A total of 118 strains of a new species, *Corynebact. hemolyticum*, was isolated from the throat and from mild skin lesions from a number of patients who had recently returned from the tropics. Details of the cultural, morphological, biochemical and toxinogenic characters, obtained from a study of nine representative strains chosen from the above cultures, are compared with those of *C. diphtheriae*, *C. ovis*, *C. pyogenes* and other corynebacteria. The nine strains examined mostly resembled *C. pyogenes* or *C. ovis* in their general behaviour, but the authors consider that certain differences in character warrant the designation of a new species. The organism was named *C. hemolyticum*.—B. WEITZ.

GLAUBIGER, A. (1948.) **The purification of diphtheria and tetanus antitoxin by the use of pepsin.**—*J. Lab. clin. Med.* **33.** 757–767. [Author's summary copied *verbatim.*] **894**

A method has been described for the purification of diphtheria and tetanus antitoxin by the use of pepsin. The results of the purification of antitoxic horse plasma or antitoxic globulins by pepsin indicate that the enzyme-treated globulins give no skin reaction in rabbits which have been immunized to the proteins of normal horse serum. Some clinical results of the use of enzyme-purified antitoxins are also described.

BARBER, M., & GLEDHILL, A. W. (1948.) **Discussion on swine erysipelas infection (Erysipelothrix rhusiopathiae) in man and animals.**—*Proc. R. Soc. Med.* **41.** 328–332. **895**

Barber reviewed *Erysipelothrix* infection in man with particular reference to the cutaneous form or erysipeloid of Rosenbach. The condition is met with fairly frequently, but as a rule the diagnosis has not been confirmed bacteriologically. It was usually only possible to isolate the organism if deep skin biopsies were taken and examined culturally: this method proved successful in five out of seven cases. An intracutaneous test (BIBERSTEIN, 1933), using filtrates from 10-day-old cultures of *E. rhusiopathiae*, gave 88% of positive results in 17 cases of active erysipeloid. 5% of 60 normal people also gave a positive result however, and no detectable agglutinins to *E. rhusiopathiae* appear in the blood-stream of persons with the localized form of the disease.

The effect of sulphonamides as therapeutic agents was stated to be disputed; experimentally penicillin had been shown to be curative in mice; one natural case of erysipeloid was recorded in which the effect of penicillin was dramatic.

Gledhill reviewed *E. rhusiopathiae* infection in animals and birds, and the distribution of the organism in nature. The epidemiology of swine erysipelas was discussed: in some localities where the disease was endemic the sera of apparently

normal animals contained agglutinins and antibodies capable of protecting mice against infection with *E. rhusiopathiae*. It was further observed that the serum and precolostrum of a cow had agglutinating titres of 1 : 40 and 1 : 160 respectively and that the precolostrum protected mice.

G. considered that if it could be assumed that specific antibodies were concerned with these agglutination and mouse protection results, it would appear that in areas in which the disease occurred subclinical infections were common. There was evidence to suggest that *E. rhusiopathiae* might produce a toxin *in vivo*.

Therapeutic and prophylactic measures against swine erysipelas were discussed. For prophylaxis attenuated viable cultures had been used; an increase of virulence, however, was noted in one strain of *E. rhusiopathiae* during subculture in 10% pig serum broth and in glucose phosphate broth. Certain natural conditions might produce such enhanced virulence in an attenuated strain. Cell-free serum broth in which *E. rhusiopathiae* had grown for 18–20 hours was antigenic, especially if fowl serum was used in the medium. This product might be useful in the immunization of pigs against swine erysipelas.

—CLIVE BRIGGS.

MAYR-HARTING, A. (1948.) **The serology of** *Pseudomonas pyocyanea*.—*J. Gen. Microbiol.* **2.** 31–39. [Author's summary copied *verbatim*.] **896**

Three main antigens were found to be variously distributed amongst strains of *Pseudomonas pyocyanea*. The serological behaviour of the strains studied depended on the presence and quantity of these antigens. It was not possible to distinguish between flagellar and somatic antigens, but those found were probably somatic.

Amongst the peculiarities of serological behaviour of bacteria in this species the most striking was a complete loss of agglutinability on moderate heating, which left the antigenic activity unimpaired.

SOMPOLINSKY, D. (1948.) Om hindring af proteusbakteriers svaermning ved hjaelp af immunserum. [**Prevention of swarming of** *Proteus* **in cultures by means of immune serum.**]—*Skand. VetTidskr.* **38.** 363–370. [English summary slightly amended.] **897**

A polyvalent H antigen, prepared from 35 *Proteus* strains, was employed for immunization of rabbits. By addition of serum (2%) or blood (4–5%) from these animals to ordinary culture media it was possible to prevent swarming of the cultures—not only of the homologous strains, but also of 105 out of 112 (94%) heterologous strains isolated later on.

This method offers the following advantages over other methods: it may reasonably be assumed to be specific in its effect, without lowering the serviceability of the culture medium for other micro-organisms.

It does not increase the daily work of routine examinations.

EWING, W. H. (1948.) **Interrelationships within the enterobacteriaceae.** pp. 66. Thesis, Cornell. **898**

The author undertook studies of *Shigella* bacteria, working out their antigenic structures, their relationships and other characters. He discussed interrelationships between members of the various genera of the Enterobacteriaceae.

—H. L. GILMAN.

KAUFFMANN, F., & PERCH, B. (1948.) **Further biochemical tests in the coli group.**—*Acta path. microbiol. scand.* **25.** 507–512. [In English. Authors' summary slightly amended.] **899**

The authors report on further biochemical tests in the *coli* group with regard to the nitrate, Voges-Proskauer, methyl-red and urea reactions. Moreover, after five or six years they repeated certain tests which on the whole demonstrated the constancy of the biochemical types earlier observed. Certain special types, e.g. such as grow on Simmons' citrate agar, are discussed.

EDWARDS, P. R., WEST, M. G., & BRUNER, D. W. (1948.) **Antigenic studies of a group of paracolon bacteria (Bethesda group).**—*J. Bact.* **55.** 711–719. [Abst. from authors' summary.] **900**

Thirty-two paracolon cultures isolated from four distinct outbreaks of diarrhoea in human beings were studied. The organisms formed a rather uniform biochemical group. They were divided into eight serological types through the examination of their O and H antigens. In general, the types established by serological examination agreed fairly well with the epidemiological data. The H antigens of some cultures were variable. The cultures studied belonged to a group of paracolon bacteria that were designated as the Bethesda group.

ROLLE, M., & KOLVASTIK, T. (1947.) Das Toxin des Bacterium abortus equi. [**Toxin of** *Salmonella abortus equi*.]—*Dtsch. tierärztl. Wschr.* **54.** 277–280. **901**

Filtrates of variously treated suspensions of *S. abortus equi* produced toxic symptoms in mice. The toxins showed a marked enterotropism.

Filtrates of broth cultures gave a flocculation reaction with an antiserum against the toxins. The same antiserum gave a slow atypical flocculation with a culture filtrate of *S. paratyphi B*, but did

not react with some other organisms of the *Salmonella* group.

Filtrates of *S. abortus equi* cultures caused abortion in pregnant mice and g. pigs. Filtrates of other salmonella, although producing similar intestinal symptoms, did not lead to abortion. The toxin of *S. abortus equi* seems, from this, to have an especially high affinity for the cells of the embryonic membranes.

Intravenous injection of the toxin into horses caused a rise in temperature which could not be obtained with the filtrates of other salmonella. Repeated high doses caused the death of the horse. Small haemorrhages in the intestine, kidney and liver, and a haemorrhagic inflammation of the mucous membrane of the small intestine were found P.M.

Culture filtrates of 39 strains gave about equal flocculation with an antiserum. Although agglutinins could rapidly be produced by injection of the culture filtrate, the flocculation reaction became positive only after a long course of injections. The serum of naturally infected horses with a high agglutination titre did not give a flocculation reaction with culture filtrates. In the opinion of the authors, the toxins do not, therefore, appear to be identical with the O-antigen.

—A. Mayr-Harting.

I. Gwatkin, R. (1948.) **Studies in pullorum disease. XX. Attempts to produce form variation in Salmonella pullorum and to differentiate the forms by growth on serum agar.—**
II. **XXI. Response to oral infection with Salmonella pullorum in comparable groups of turkeys and chickens.**—*Canad. J. comp. Med.* **12.** 8–11; & 47–55, 74–81, & 109–115. [For previous parts, see *V. B.* **19.** 44–47.] **902**

I. The work reported in this paper represents continued efforts to produce form variation of *S. pullorum* along lines suggested by studies of other workers with R. and S. forms of pneumococci.

In addition to *in vivo* experiments in which g. pigs, white mice and chickens were inoculated with living and killed cultures of regular and variant strains of *S. pullorum* in the presence of heat-killed heterologous strains, culture studies of regular and variant forms on liquid and solid media containing a killed suspension of the heterologous form and on agar plates containing a specific serum, were undertaken. From the nine experiments carried out it was determined that the behaviour of variant and regular form cultures of *S. pullorum* on homologous or heterologous serum agar was not of value in differentiating a regular from a variant strain of this organism, nor did any change in form result from passage through g. pigs, mice and chickens in the presence of large quantities of killed heterologous form culture.

II. The preliminary studies deal with trials designed to determine the proper dosage of a selected variant strain of *S. pullorum* which, given by mouth, would ensure uniform infection of an experimented group of chickens and turkey poults; also subsequent steps undertaken in regard to dosing, feeding and housing 150 day-old poults and 308 day-old chicks in addition to 49 poults and 47 chicks added later as a check on pen infection. Sero-diagnostic and cultural methods are described and tabulated results covering mortality in poults and chicks during the first 35 days and the recovery of *S. pullorum* from these birds are given.

Percentages of daily losses in poults and chicks are graphically illustrated and figures for recovery of *S. pullorum* from individual organs are presented.

Preparation and use of whole blood and tube test antigens are described and the percentage of positive and questionable reactions on the principals is shown together with reactions in contact birds on the first six tests.

G. concludes that the high mortality rate in both turkey poults and chickens removes any doubt as to the virulence of the variant strain of organism used in his experiments and the results suggest that poults may become infected as readily as chickens of the same age by pen infection, but the number that remain infected is yet to be determined.—A. B. Wickware.

Rice, C. E. (1948.) **Studies in pullorum disease. XXII. Technique of the indirect complement-fixation test for activity with *Salmonella pullorum* antigens.**—*Canad. J. comp. Med.* **12.** 130–136. **903**

A method of titrating antibody in anti-pullorum serum from chickens which cannot be tested by the usual direct complement-fixation methods. It is based on the inhibitive effect of such sera on the fixation of complement by anti-pullorum rabbit serum and *S. pullorum* antigen. It is suggested that this indirect method may be of value as a supplementary serological method in experimental studies of pullorum infection and more particularly in connection with non-pullorum reactions. Careful adjustment of all reagents is absolutely essential for the satisfactory working of this test.—R. Gwatkin.

Cantor, A., & McFarlane, V. H. (1948.) ***Salmonella* organisms on and in chicken eggs.** —*Poult. Sci.* **27.** 350–355. **904**

Shell scrapings and contents of over 2,000 hens' eggs were examined for salmonella infection. 0·6% of shell scrapings and 1·2% of egg contents were found to be so contaminated. Not once were salmonella organisms isolated from contents and shell of the same egg. The types found were

*S. montevideo* and *S. anatum* from shells and *S. pullorum* from the egg contents. Most of the infected eggs had been marked low in grading.
—A. MAYR-HARTING.

HOLTMAN, D. F., & FISHER, G. (1947.) **The application of sulfonamides to the control of typhoid in poultry.**—*Poult. Sci.* **26.** 478–488. **905**

Sulphonamides are now extremely important in controlling fowl typhoid when applied along with sanitary measures and blood-testing. Relatively large infective doses of *Salm. gallinarum* can be administered to young chicks without development of serious illness if sulphonamide therapy is applied before the end of the incubation period. Water is a more suitable medium than food for administration of soluble sulphonamides to chicks as, with the onset of fever, chicks will continue to take water but not solid food. Definite benefit was derived from 0·1–0·3% sodium sulphathiazole in water when given either at the onset of symptoms or immediately after oral administration of the infectious agent. Soluble sulphonamide II (consisted of sodium sulphamerazine, sulphathalidine and sodium carbonate, quantities not stated) at from 0·1–0·5% was employed with benefit either in food or water. Sodium sulphamerazine in percentages varying from 0·1–0·3 in food or water was given to several groups of chicks for five-day periods. Treatment was then discontinued, but the chicks were kept until all of the untreated infected controls had died, approximately 12 days after infection. Since fowl typhoid can occur in older birds some month-old chicks were infected with *Salm. gallinarum* to test the efficacy of soluble sulphonamide II in the control of experimental infection in birds of large size. When administered in water or in feed at a concentration of 0·5% immediately after infection no mortality occurred; when administered in water after the onset of the disease there was 25% mortality. Seventy-five % of the infected untreated controls died. When 0·5% was administered in the feed after onset of the disease 50% died. Sodium sulphamerazine was supplied through the water in 0·2% concentration for five days once a month for five months to adult hens that had been proved to be reactors to pullorum and fowl typhoid rapid plate and tube antigens. Rapid and tube agglutination tests were run every month and gradually became either doubtful or negative and attempts to culture from various organs P.M. gave negative results, whereas two untreated controls yielded *Salm. gallinarum* and one *Salm. pullorum.* The authors conclude that the evidence indicates that sulphonamides in drinking water are highly effective in controlling fowl typhoid infection, but that these agents should not be too fully relied upon for the solution of a problem that still calls for the use of the most thorough sanitary precautions around premises where poultry are kept.—C. H. S.

PATERSON, J. S. (1947.) **Calfhood vaccination against Bang's disease, using an aerobic strain of *Brucella abortus* of moderate virulence.**—*Vet. Rec.* **59.** 115–119. [Author's summary copied *verbatim.*] **906**

In the series of experiments recorded, a smooth aerobic strain of *Br. abortus* of moderate virulence (McEwen 161) was inoculated subcutaneously into 34 heifer calves five to seven months old.

Eight calves were killed at intervals from 58 to 182 days after vaccination. In one instance, the calf killed 99 days after vaccination, a $CO_2$-sensitive strain, was recovered indirectly through guinea-pigs inoculated with a suspension of the head and thoracic glands of the calf. The seven other calves were free from brucella infection. It would appear that, generally, young calves rapidly eliminate *Br. abortus* which has been inoculated subcutaneously.

The degree of protection which is set up by calfhood vaccination with $40 \times 10^9$ *Br. abortus* (McEwen 161) is of a high order when the heifers are exposed to infection 18 months later when approximately four and a half months in calf. Of 14 vaccinated heifers exposed to infection at this time, twelve produced normal calves and themselves showed no evidence of brucella infection; one aborted and one had a premature calf. Both of the latter animals and their calves were proved to be infected with *Br. abortus.* Of eight unvaccinated heifers similarly exposed to infection, six aborted, one calved prematurely and one calved normally. All the unvaccinated animals were proved to be infected with *Br. abortus.*

When twelve vaccinated heifers were exposed to infection 32 months after vaccination, when they were approximately four and a half months pregnant, three aborted and one gave birth prematurely, all being proved to be brucella infected. The remaining eight vaccinated animals produced normal full-time calves and attempts to recover *Br. abortus* from them failed. Of six unvaccinated heifers similarly exposed to infection five aborted and were proved infected and one calved normally. Brucella infection was not proved in this latter animal.

There are reasons for regarding McEwen strain 161 as unsuitable for use as a calfhood vaccine. The view is advanced that calfhood vaccination requires reinforcement during adult life to keep resistance at a high level.

DONKER-VOET, J. (1948.) *Brucella suis.*—*Ned.-*

*ind. Bl. Diergeneesk.* **55.** 91–95. **907**

A general account of the subject.—J. T. G.

WOOD, R. M. (1948.) **A new and rapid method for the preparation and standardization of Brucella Ring Test antigen.**—*Amer. J. publ. Hlth.* **38.** 1225–1227. [Author's summary copied *verbatim.*] **908**

A method for the rapid production of large quantities of *Brucella* antigen with the complete absence of both agar particles and dissolved agar is described. The antigen is satisfactory for use in the usual methods of testing as well as for the Ring Test.

The Ring Test has been found as sensitive as whey titration for detecting *Brucella* agglutinins in milk.

SPINK, W. W., BRAUDE, A. I., & GOYTIA, R. S. (1949.) **Aureomycin therapy in human brucellosis due to *Brucella melitensis*.**—*J. Amer. med. Ass.* **138.** 1145–1148. **909**

The authors refer to the use of a combination of streptomycin and sulphadiazine for the treatment of human brucellosis, stating that in small-scale tests useful results had been obtained, but that the streptomycin caused some vestibular dysfunction in some of the patients.

They report the results of a trial of aureomycin, an antibiotic prepared from *Streptomyces aureofaciens* at the Lederle Laboratories. In comparisons made with streptomycin, both *in vitro* and in infected chick embryos, streptomycin was more active than aureomycin weight for weight against all three species of brucella. Aureomycin had the advantage, however, that it could be given to ambulant human patients.

They now report in some detail treatment of 24 patients infected with *Br. melitensis* and with varying degrees of illness. The patients were kept under observation periodically for one to three months and blood cultures were made. Within the limits of observation over this period the results were considered to be good. Patients who were very severely ill improved greatly in health and blood cultures were negative.

GERHARDT, P., & WILSON, J. B. (1948.) **The nutrition of brucellae; growth in simple chemically defined media.**—*J. Bact.* **56.** 17–24. **910**

The authors grew 28 strains of *Br. abortus*, *Br. suis* and *Br. melitensis* under aerobic conditions in a medium containing a combination of mineral salts, four accessory growth factors, lactate, glycerol and a single nitrogen source. The best results were obtained with DL-asparagine as nitrogen source. L-glutamic acid or L-histidine may be used as a substitute for asparagine. All but four grew well from relatively small inocula.

—E. KLIENEBERGER-NOBEL.

VERGE, J., & SAURAT, P. (1947.) Les maladies communes à l'homme et aux animaux. La tularémie (suite et fin). **[Diseases common to man and animals. Tularaemia (continuation and conclusion).]**—*Rev. Méd. vét., Lyon et Toulouse.* **98.** 337–354. **911**

Emphasis is laid on public health measures for control, notably publicizing the danger of rodents to man and the importance of meat inspection. Legislative measures in France already prohibited the import of rodents from infected countries. Further measures have been adopted and tularaemia has been added to the list of notifiable diseases in France.—G. V. L.

VERGE, J., & SAURAT, P. (1947.) La tularémie. **[Tularaemia.]**—*Rev. Méd. vét., Lyon et Toulouse.* **98.** 289–313. **912**

A general review on the subject, following the discovery in 1946 of cases in animals and man in France.

The varying virulence of tularaemia in different countries is noted.

Symptoms and lesions in domestic animals, in rodents and in man, are given in detail. Sheep appear to be the most susceptible domestic animals.

Diagnosis by laboratory methods is discussed. Inoculation into white mice or g. pigs is the most reliable means of identification. In man, the agglutination test gives the most reliable results. Agglutination occurs at high titres 1 : 320 to 1 : 2,560 or more. It is not entirely specific, in that *Brucella* may cross-agglutinate.—G. V. L.

JAMES, H. D., & DOYLE, L. P. (1947.) **Further studies with a vibrio as the etiologic agent of swine dysentery.**—*J. Amer. vet. med. Ass.* **111.** 47. **913**

The authors record that a vibrio was isolated from the submucosa of the caecum of a case of dysentery in a pig. The organism was grown in 10% defibrinated horse blood agar under 15% $CO_2$ concentration. When fed in a suspension of gastric mucin this culture produced dysentery in 50 out of 60 dosed animals. Affected bowel from field cases when fed to susceptible pigs caused infection in a proportion (unstated) of cases [see also *V. B.* **15.** 140].—J. A. J. VENN.

THORNBURY, R. S. (1948.) **Sodium sulphapyridine in the treatment of footrot in dairy cows.**—*Aust. vet. J.* **24.** 254–265. **914**

Twelve of thirteen cases of foot rot of from 1–10 days' duration responded immediately to treatment with sodium salts of sulphapyridine or sulphathiazole given intravenously. The shorter the duration of the case the better the result. Local treatment of the lesion is undesirable in the common form with only the foot affected.

Surgical treatment is required for cases with lesions affecting deep structures.—D. C. Blood.

Norris, R. F., Shorey, W. K., & Bongiovanni, A. M. (1948.) **Lesions produced in chick embryos by** *Candida* (*Monilia*) *albicans.*—*Arch. Path.* **45.** 506–512. Authors' summary copied *verbatim.*] **915**

The lesions caused by C. albicans in the tissues of the embryo when inoculated intravenously in 11 day old embryonated hens' eggs were similar to those produced in the chorioallantoic membrane. The lesions also resembled those reported in man and in animals experimentally inoculated with C. albicans.

If the chick embryo is not quickly overwhelmed by the infection, there are at first focal areas of liquefaction necrosis, associated with hemorrhage and scanty granulocytic infiltration. As the lesions become older, the granulocytic infiltration becomes greater and larger numbers of mononuclear phagocytes and multinucleated giant cells, accompanied by proliferating fibroblasts, surround the focal necroses.

Howell, A., Jr. (1948.) **Isolation of pathogenic fungi from experimentally inoculated guinea pigs.**—*Publ. Hlth Rep., Wash.* **63.** 602–616. [Author's summary copied *verbatim.*] **916**

A study has been made on the susceptibility of guinea pigs to intraperitoneal inoculations with the yeast phase of *H. capsulatum*, *B. dermatidis*, and *Candida* (*Monilia*) *albicans.* With the dosages and strains of these fungi employed, it has been shown that:

1. Only 3 of 80 guinea pigs inoculated in this manner with large doses of the yeast phase of *Histoplasma* and 17 of 82 similarly inoculated with *Blastomyces* developed a generalized infection. Of 35 similarly inoculated with *C. albicans*, none developed such an infection.

2. There was no correlation between the size of the inoculating dose and the number of animals which developed generalized infection.

3. Relatively small doses of these fungi are as effective as larger ones in producing skin sensitization of these animals.

4. Both *H. capsulatum* and *B. dermatidis* could be readily isolated from the spleens of apparently healthy guinea pigs which had been inoculated with variable doses of these fungi 9 to 10 months previously, even though there were no gross lesions apparent at autopsy. *C. albicans* could not be recovered from guinea pigs inoculated with this fungus 2 to 3 months previously.

Thjötta, T., & Jonsen, J. (1947.) *Streptothrix* (*Actinomyces*) *muris ratti* (*Streptobacillus moniliformis*) **isolated from a human infection and studied as to its relation to Emmy Klienebergers L I.**—*Acta path. microbiol. scand.* **24.** 334–351. [In English.] **917**

The authors examined a strain of *Streptobacillus muris ratti* (*Streptobacillus moniliformis*) isolated from a human case. Using Klieneberger's method for fixing and staining their specimens they were able to demonstrate the aberrant morphological forms observed earlier by Klieneberger, but they do not ascribe the peculiar morphology of this organism to the presence of two different components (a bacterium and a pleuropneumonia-like organism) as did Klieneberger, but regard these as variant forms of the bacterium. Quite correctly they point out that the biological significance of these variants is not yet clear.

—E. Klieneberger-Nobel.

Craige, J. E. (1948.) **Spirochetes associated with dysentery in dogs.** [*S. eurygyrata.*]—*J. Amer. vet. med. Ass.* **113.** 247–249. **918**

A type of dysentery in dogs is described in which large numbers of spirochaetes are present on microscopic examination of the faeces. The organism seems to be identical with that described by Jungherr (1937). Case reports are given. Sulphonamide drugs (not specified) are stated to be effective in treatment, especially in mild cases. In severe cases sulphonamides and streptomycin by the mouth and penicillin subcutaneously have been used. Similar organisms were also found in six cats affected with diarrhoea.—M. C.

Stavitsky, A. B. (1948.) **Characteristics of pathogenic spirochetes and spirochetoses with special reference to the mechanisms of host resistance.**—*Bact. Rev.* **12.** 203–255. [Author's conclusions copied *verbatim.*] **919**

1. The pathogenic spirochetes and spirochetoses conform very closely to the established principles of pathogenesis and host resistance in infectious diseases.

2. The spirochetes are heterogeneous and from the standpoint of pathogenesis of the infections they cause, as well as taxonomy, may be divided into treponemas, borrelias and leptospiras.

3. There seems to be an essential similarity in the pathogenesis and host resistance in spirochetal infections which involves the cyclical character of symptomatology and lesions in these diseases and the parallel cyclic morphologic changes in the spirochetes.

4. On the basis of present knowledge antibody formation with lytic properties seems to be the most important factor in acquired resistance in spirochetoses. Phagocytosis apparently is a secondary or accidental phenomenon.

5. Some of the characteristics of spirochetes such as antigenic variability, and capacity to produce relapses may be related to their possession

of the ubiquitous Wassermann type of lipid antigen.

6. The resemblance of trypanosomes and trypanosomiases to spirochetes and spirochetoses on the basis of points 3, 4, and 5 suggests that these two groups of microörganisms may be biologically related.

7. The spirochetes must be commended as a virgin field of study for general microbiologists as well as immunologists.

KASCHULA, V. R. (1948.) *Treponema theileri* **of a donkey and its transmission to a calf.**—*J. S. Afr. vet. med. Ass.* **19.** 100–102. **920**

The occurrence of a spirochaetal infection in a donkey foal is described, the animal having fever, keratitis and an exfoliation of the surface layers of the skin. *Babesia equi* was also present, and it is suggested that the spirochaetosis, though secondary to the biliary fever, yet helped to aggravate the condition. The condition improved in a few days without treatment.

The spirochaete was transmitted to a calf by blood inoculation, and is considered to be identical with *Treponema theileri*.—U. F. RICHARDSON.

CROSS, R. M. (1945.) **Penicillin in Weil's disease.**—*Lancet.* **248.** 211–212. **921**

A report on the successful use of antiserum and penicillin for *Leptospira icterohaemorrhagiae* infection in a human being. A total of 800,000 units of penicillin was given over a period of eight days, the serum having been given early in the course of treatment. Leptospira were present in the urine three days after serum treatment, but they disappeared 24 hours after the commencement of penicillin therapy.

Penicillin was effective also in the treatment of g. pigs experimentally infected with *L. icterohaemorrhagiae*.—A. R. JENNINGS.

DUBOS, R. J. [George Fabyan Professor of Comparative Pathology and Professor of Tropical Medicine, Schools of Medicine and Public Health, Harvard University]. (1946.) **The bacterial cell in its relation to problems of virulence, immunity and chemotherapy.** pp. xix + 460. Numerous figs. & tables. Cambridge, Mass.: Harvard University Press; London: Geoffrey Cumberlege. 8vo. **$5.00.** **922**

In this remarkable work the author has taken the structure and the physiology of the cell as the basis for a comprehensive study of bacterial life. A discussion on the phylogeny of bacteria reveals the importance of critical methods, direct and indirect, in the examination of cellular structure. A plea is made for the complete classification of bacteria by serological methods and the author demonstrates the short-comings of direct visualization methods for such purposes. The significance of the various components of the bacterial cell is surveyed and discussed in relation to virulence, pathogenicity and antigenicity. Staining reactions, which are regarded from the physico-chemical angle, are discussed at length. Throughout this book, the variability of individual bacterial species is emphasized, but the difficulty can be overcome by the selective inactivation or absorption of the antigenic components and the application of these methods is illustrated by the results which have been obtained with certain Gram negative bacilli. Conversely, the critical appreciation of immunochemical methods has revealed indirect information on the architectural structure of the organism. There is a chapter on the enzymes of bacteria and again the individual strain variation is seen to affect the systems concerned. Enzyme production is noted to be associated with cell enlargement and not necessarily with active multiplication.

The chapter on the nature of virulence is particularly interesting, while elsewhere the author considers the process of immunization chiefly as it is affected by the bacterial cell, laying some emphasis on the study of the capsular antigens. Lastly, a comprehensive review of bactericidal agents and their mode of action is brilliantly exposed.

In an addendum C. R. Robinow gives a detailed account of bacterial spore and nuclear structure.

The presentation of this book is pleasant and the style is remarkably clear and a number of carefully selected illustrations are included.

This study is a great contribution to the bibliography of this very broad subject and the author is most successful in the comprehensive, yet critical, survey which he has achieved.—B. W.

DOAK, B. W., & LAMANNA, C. (1948.) **On the antigenic structure of the bacterial spore.**—*J. Bact.* **55.** 373–380. **923**

The spore possesses specific "spore antigens", but it also has antigens in common with the vegetative cells. In order to discover these common antigens either an extended immunization has to be carried out or the spores used as antigen have to be treated with an alkali. Precipitinogens seem to occur on the spore surface and precipitating antibodies have been demonstrated in the spore immune sera. When closely related organisms are used cross agglutination reactions between spores from different species can be demonstrated.

—E. KLIENEBERGER-NOBEL.

WYNNE, E. S., & FOSTER, J. W. (1948.) **Physiological studies on spore germination with special reference to** *Clostridium botulinum.* **I. Development of a quantitative method. II.**

**Quantitative aspects of the germination process.** —*J. Bact.* **55.** 61–68, and 69–73. **924**

I & II. The authors describe a method for quantitative studies of spore germination in *Cl. botulinum* and other anaerobes. The obstacle of dormancy was eliminated by the use of an appropriate medium with the addition of starch.

They show that the process of spore germination is logarithmic. The length of the lag period in germination varies inversely with the logarithm of the number of spores per ml. in the inoculum.—E. KLIENEBERGER-NOBEL.

WAKSMAN, S. A. (1947.) **Soil organisms and disease.**—*Yearb. U.S. Dep. Agric.*, 1943-1947. pp. 511–517. **925**

This general account of soil as a purifier indicates that soil deals with contaminating pathogenic organisms by physical adsorption and biological destruction. It also operates through the action of antibiotics. The practical application of tyrothricin, penicillin and streptomycin which are derived from typical soil forms is briefly discussed.—K. G. TOWERS.

*See also absts.* **1045** (*B. coli* in granuloma of fowls); **1052-1056** (antibiotics); **1100** (mycotic infection of prepuce in bulls); **1101** (*Pseudomonas pyocyanea* in semen of bulls); **1109-1110** (technique); **1124** (mastitis); **1125** (conference on brucellosis); **1127** (manual of microbiology); **1128** (leptospirosis); **1130** (mastitis in Denmark); page 252 (Books recently received).

## DISEASES CAUSED BY PROTOZOAN PARASITES

CLAMPIT, J. M. (1948.) **Comparative therapy of *Endamoeba histolytica* infections in the kitten.** —*Amer. J. trop. Med.* **28.** 289–294. **926**

In order to evaluate amoebicides, kittens were used as experimental animals, inoculated with culture of a virulent strain of *E. histolytica* into the ileum immediately above the ileo-caecal valve. Some indications were obtained that different litters of kittens might vary in susceptibility. The disease was usually of the fulminating type with diarrhoea developing in 1–3 days, loss of appetite, often bacterial infections of the eyes and upper respiratory tract and death in about three days after the appearance of the amoebae in smears or cultures, unless treatment was given.

The drugs tested in treatment were "didoquin," vioform [β-hydroxy-7-iodo-5-chloroquinoline], chinoform [a mixture of 8-hydroxy-7-iodoquinoline-5-sulphonic acid, sodium bicarbonate and isomeric hydroxy iodoquinoline sulphonates], carbarsone [*p*-carbamino phenyl arsonic acid] and emetine. Many kittens died within 48 hours of the initiation of treatment, probably before the drug was fully effective, and others survived this period but died during treatment.

All the amoebicides were active with the exception of emetine, no emetine treated kitten surviving more than seven days, though no pathological changes were encountered to suggest drug toxicity. All the other amoebicides are probably more effective against the chronic type of disease in man. Control kittens only survived three days on the average, so that a very rapid action of the drug would be required.

One kitten relapsed twice after apparent cures. Relapses may have been caused by re-infections. —U. F. RICHARDSON.

EVANS, J. T. R. (1948.) **Trypanosoma congolense infection in cattle in the Sudan: treatment with dimidium bromide [Phenanthridinium 1553].**—*Vet. Rec.* **60.** 418–420. **927**

It is said that trypanosomiasis occurs in most cattle rearing areas of the Sudan, probably spread by cattle and game moving to and from tsetse areas. Until recently the losses have not been serious, but in 1946–47 it is estimated that 10,000 cattle died. Tsetse have never been found in these areas, and it is thought that infection is maintained by *Stomoxys* and *Siphona*, the recent increase being explained by increased cattle movements due to widespread immunization against rinderpest and pleuro-pneumonia.

Early experiments indicated that dimidium bromide in doses of 1–2 mg. per kg. was effective and safe to use, a few relapses occurring with the smaller dose, and one mild case of photosensitization with the higher one. Subcutaneous inoculation caused serious swellings, and intramuscular inoculation appeared to be preferable.

In a field experiment 10,000 cattle were treated with 1 mg. per kg., all improving in condition. A different preparation of the drug was used in this case, and in 500 animals treated subcutaneously only mild swellings developed.

Later 40,000 cattle were treated subcutaneously. Alarming symptoms of photosensitization developed, which were ascribed to poor grazing conditions, and when these were improved the symptoms subsided, the final loss being under 1%.

Eventually 350,000 cattle were treated subcutaneously with an approximate dose of 1 mg. per kg. The loss was negligible, and although in a few cattle trypanosomes continued to be found, all improved in condition. Infections in animals which relapsed might have been recent, and the trypanosomes might have developed resistance to dimidium bromide.—U. F. RICHARDSON.

BORDIUG, A. (1948.) Immunisierungsversuche gegen *Trypanosoma equiperdum.* **[Immunization experiments against *Trypanosoma equiperdum.*]**—*Skand. VetTidskr.* **38.** 371–378. [In

German, abst. from English summary.] **928**

The author gives the results of some orienting immunization experiments on mice against *T. equiperdum*. For active immunization vaccines consisting partly of formalin-treated trypanosome-containing blood and partly of formalin-treated trypanosome suspension in physiological saline solution were used. Immune serum from guinea pigs treated previously partly with vaccine and partly with living trypanosomes was used for passive immunization.

By repeated vaccine injections a distinct protective effect could be attained in mice against subsequent trypanosome infection. The immune serum had good protective action.

MORACZEWSKI, S. A., & KELSEY, F. E. (1948.) **Distribution and rate of metabolism of phosphorus compounds in *Trypanosoma equiperdum*.**—*J. infect. Dis.* **82.** 45–51. **929**

A study was made of the metabolism of phosphorus compounds in a strain of *T. equiperdum* cultivated in albino rats, as an indication of enzyme activity.

It is claimed that evidence was obtained that the trypanosome is capable of synthesizing organic phosphorus compounds from inorganic phosphate supplied to it by the plasma, and that it must possess all the enzymes necessary for the synthesis of phosphorus compounds. The suppression of one of these systems by drugs might be revealed by a study of the phosphorus turnover rates.

—U. F. RICHARDSON.

MARSHALL, P. B. (1948.) **The glucose metabolism of *Trypanosoma evansi* and the action of trypanocides.**—*Brit. J. Pharmacol.* **3.** 8–14. **930**

Experiments are described on the metabolic activity of *T. evansi* in mouse blood diluted with isotonic buffer containing glucose. The findings are summarized :– (1) These trypanosomes metabolize glucose mainly to pyruvic acid, though a small quantity of this end-product is probably further utilized by decarboxylation. (2) The intermediate metabolism follows the typical Embden-Meyerhof-Parnas scheme characteristic of yeast and muscle metabolism. (3) Some of the nutritional factors may be obtained from the plasma of the host. (4) Trypanosomes appear to be able to utilize the lactic acid of the host blood, probably by conversion to pyruvic acid. (5) The effects of trypanocides indicate that trivalent arsenicals inhibit the hexodinase reaction in trypanosomes ; that the pentavalent arsenicals are inactive unless reduced to the trivalent state ; that straight chain diamidines partially inhibit the dehydrogenase system ; and that aromatic diamidines (stilbamidine) probably inhibit the decarboxylation of pyruvic acid.—U. F. RICHARDSON.

CORSON, J. F. (1946.) **Heterogeneity of strains of polymorphic trypanosome : its relation to natural and experimental transmission.**—*Trop. Dis. Bull.* **43.** 169–176. **931**

It is pointed out that several interesting questions in respect of sleeping sickness require further investigation. The incidence and significance of inapparent, mild or chronic infections in areas where the disease is mainly acute, and the old problem of the relationship of the three species of polymorphic trypanosomes, and the question of the reservoirs of human trypanosomes in domestic and wild animals need further inquiry. The three species of polymorphic trypanosomes are considered to be morphologically indistinguishable, but they have physiological differences. Both types of human trypanosomes are known to occur in the same territory, and strains with intermediate characters have been recorded. It appears probable that mixed infections occur —*T. gambiense* and *T. rhodesiense* in man, and either of these with *T. brucei* in animals—but no investigations of this have been made.

Every strain of polymorphic trypanosomes must be regarded as of heterogonous composition when isolated, and at least for a considerable time afterwards. Human strains of trypanosomes are not necessarily able to infect man at all times, and possibly none of them could infect very resistant individuals. Such a strain isolated from a naturally infected animal and tested on a very resistant person would probably be called *T. brucei*.

That selection must occur during the transmission of polymorphic trypanosomes from one host to another has been recognized, but its occurrence has not been definitely proved. In the vertebrate host the composition of the strain must be constantly changing, hence a single tsetse fly feeding on the same infected animal, or man, on different occasions would take up different samples of trypanosomes, and two or more flies feeding at the same time would not necessarily take up identical samples. In the tsetse fly also further selective changes in the strain probably occur. It has been shown that a tsetse in biting ejects different numbers of trypanosomes at different times, and these quantitative differences may imply qualitative differences. The second vertebrate host would also exert a selective influence on the strain, some of the trypanosomes being able to infect it and others not.

Apart from the effects of selection, a strain may undergo variation by actual protoplasmic changes, and the loss of transmissibility by tsetse flies in old laboratory strains appears to indicate an actual change in the trypanosomes. Attention is also drawn to the persistence of such changes as drug resistance and the loss of the kinetoplast.

If it is confirmed that sexual reproduction takes place, the subject of variation would be still more complicated, and the possibility of hybridization would need consideration.

The question of loss or increase of virulence is also discussed, it being suggested that a change can only be accepted after uniform results have been obtained from a considerable number of transmission experiments with a considerable number of flies and animals.

In order to reduce the variable factors in experiments as much as possible, it is suggested that an inbred strain of mice might be used as the vertebrate host, tsetse pupae from a definite area as transmitters, and clones of recently isolated strains of trypanosomes. It is also suggested that much might be learnt about selection in transmission by the use of mixtures of normal trypanosome clones, and clones which have been "labelled" by being rendered drug resistant, and are thus recognizable.—U. F. R.

PACKCHANIAN, A. (1948.) **The fate of some pathogenic trypanosomes in *Triatoma* and *Ornithodorus*.**—*Amer. J. trop. Med.* **28.** 541–543. **932**

Experiments are recorded of the feeding of various species of *Triatoma* and *Ornithodoros* on experimental animals infected with *T. brucei*, *T. gambiense* and *T. rhodesiense*. The first two trypanosomes were found to be capable of survival in the arthropod gut for 3–5 days, and *T. rhodesiense* was found to remain viable in the ticks for six days. The inoculation of susceptible animals with the crushed ticks, ten days after the infecting feed, gave negative results. It is concluded that *Triatoma* and *Ornithodoros* will not play any major part in the transmission of nagana or sleeping sickness.—U. F. RICHARDSON.

DOCKER, T. M. (1948.) **Bovine trichomoniasis. Its diagnosis and control in New Zealand herds.**—*Aust. vet. J.* **24.** 226–234. **933**

Trichomonads were first recognized in New Zealand in the same year as the first report of the disease in England, and have been observed on many occasions since. Vaginitis due to other causes is common and early cases of trichomoniasis with vaginitis may be missed. A special technique is used in obtaining samples from the vagina. The allergic test is being examined as an aid in diagnosis.

Sexual rest for 2–3 months for infected cows is not practicable because of the necessity for strictly seasonal mating in New Zealand. Sexual rest for one oestrual period and then artificial insemination or service by a clean bull are recommended, although the latter may become infected.

The short mating season makes treatment and control at a particular time difficult. Few bulls are kept long and are usually disposed of to abattoirs. This, together with the absence of the communal bull, has probably restricted the spread of the disease. Control by making the disease notifiable and restricting the movement of cattle is not anticipated until a more accurate method of diagnosis is available.—D. C. BLOOD.

GORDEUK, S., Jr., LEARNED, M., & THORP, W. T. S. (1947.) **Observations on the chemotherapy of cecal coccidiosis.**—*Vet. Med.* **42.** 223–228. **934**

Experiments were carried out to determine the value of various sulphonamides in the treatment and prevention of caecal coccidiosis. Blood concentrations attained by the drugs, the average weight gains, mortality percentage and the incidence of gross visceral lesions were used as criteria in determining the therapeutic value of each drug. Average weight gains were not significantly affected under sulphonamide therapy. Sulphamethazine at 0·2 or 0·4% in the mash and 0·15% chlorodiazine in mash given for two days beginning at 72 hours after infection prevented losses from caecal coccidiosis. Favourable results were obtained by giving 1% sulphaguanidine and "cerelose" in the drinking water or 1% sulphaguanidine in mash for two days, beginning 72 hours after inoculation. There was no apparent relationship between the use of sulphonamides and the incidence of gross liver or spleen lesions. Development of immunity, as indicated by the results obtained from using challenge doses of coccidia, was not affected.—C. HORTON SMITH.

ZUCKERMAN, A. (1946.) **Infections with *Plasmodium gallinaceum* in chick embryos induced by exoerythrocytic and blood stages.**—*J. infect. Dis.* **79.** 1–11. **935**

Infection of the chick embryo was obtained by means of chorio-allantoic implants of tissue containing exoerythrocytic forms and by intramuscular injection with erythrocytic forms. Both types of infection were studied as was the action of suppressive drugs. Exoerythrocytic stages were also grown on tissue culture explants of embryonic spleen which proved to be superior to adult spleen. —M. C.

HAIBA, M. H. (1948.) **Plasmodia of common Egyptian birds.**—*J. Comp. Path.* **58.** 81–93. **936**

A survey of wild and domestic birds for haematozoan parasites, especially for plasmodia, was made. Five hundred fowls, 150 domestic pigeons, 120 ducks and 120 turkeys with smaller numbers of various species of wild birds were examined. Parasites were found in 62 individuals of these, 40% had species of plasmodia and 60%

species of haemoproteus. The species of plasmodia were identified as *P. praecox*, *P. cathemerium*, *P. elongatum*, *P. rouxi*, *P. nucleophilum* and it is stated that a single specimen of *P. gallinaceum* was found in blood from the carcass of a dead fowl of European breed. [The finding of *P. gallinaceum* is unexpected. This species has been recorded from Indo-China, Ceylon and India only and its presence in Egypt in a fowl of "an European breed", if confirmed, extends the geographical range of the species. As the parasite was not found in any of the other 500 Egyptian fowls which were examined the finding must await confirmation.] A species of *Haemoproteus* was found in ducks, which resembled an unnamed species described by Herman (1938). H. proposes the name *H. hermani* for this species.—M. C.

I. Ivanic, M. (1942.) Untersuchungen über die in den inneren Organen der Saugetiere vorkommende parasitäre Zerstörungsarbeit und die damit verbundene multiple Teilung (Schizogonie) bei Piroplasmen der Familie Babesiidae (Piroplasmidae). V. Der Körperbau, die gewöhnliche Zweiteilung und die in den inneren Organen der weissen Ratte (Mus rattus L. var. albinos) vorkommende multiple Teilung (Schizogonie) bei Babesia muris Fantham. **[Schizogony of piroplasms of the family Babesiidae. V. Body structure, usual nuclear division and schizogony of *Babesia muris* Fantham in the internal organs of the white rat.]** II. VI. Uber die in den Leber zellen des Schafes (Ovis aries L.) vorkommende multiple Teilung (Schizogonie) und die parasitäre Zerstörungsarbeit bei Babesiella ovis Babes. **[VI. Schizogony in the liver cells of the sheep (*Ovis aries* L.) and the parasitic destructive action of *Babesiella ovis* Babes.]**—*Cellule.* **49.** 187–206; & 209–232. **937**

I. *Babesia muris* has been observed in white rats as the typical pear-shaped form, the discoid and ring-shaped form, and the amoeboid stage in the red blood-corpuscles or moving freely within the blood-plasma. Multiplication by binary fission of the discoid and ring-shaped forms respectively has been observed. Multiplication by means of schizogony takes place in the cells of the spleen and kidneys of the rat with destruction of these cells. The various stages of development of *B. muris* are found both in the cytoplasm and the nucleus of the parasitized cells.

Two types of schizogony occur, one producing few and the other a large number of daughter cells. The stages in the life-cycle of *B. muris* and *Leucocytozoon anseris* are similar. There is thus a definite connexion between *B. muris* and the *Haemoproteidae* family. Therefore, in the author's opinion, *B. muris* and also other piroplasma such as *B. caballi*, *B. bovis*, *Babesiella ovis* and the leucocytozoon *Leucocytozoon anseris* should be included in the Haemosporidia, as already stated by him in earlier publications (1937–38).

A plate illustrates the various stages of development of the parasite in blood-corpuscles and cells.

II. The author describes the binary fission of the discoid stage and the schizogony of the large polynuclear plasmodium-like stage of *Babesiella ovis* in the liver of sheep and the destructive action on parasitized liver cells.

Two types of schizogony have been observed —one by division of the mother cell and the other by means of budding, producing daughter cells of various sizes. In addition, small plasmodium-like cells were also found. They reproduced by schizogony, minute discoid daughter cells being formed which in turn multiplied by binary fission. There are two types living respectively in the cytoplasm and the nucleus; the cytoplasmic parasites sometimes destroy the nucleus and the nuclear parasites may destroy the cytoplasm. As the main site of *B. ovis* is the liver, the pear-shaped and discoid stages in the peripheral bloodstream are to be regarded as secondary phenomena. Therefore the transmission of piroplasma infection by ticks appears to be only a secondary occurrence.

On account of the large multinuclear plasmodium-like form and its schizogony, the piroplasma are to be regarded as related to *Rhizopoda*.

A plate illustrates the various stages of *B. ovis* in the cells of the liver.—E. G.

Enigk, K. (1947.) Zur Frage der Einschleppung der Pferdepiroplasmosen nach Deutschland. **[The possibility of equine piroplasmoses (*Babesia* infections) being imported into Germany.]**—*Dtsch. tierärztl. Wschr.* **54.** 1–6. **938**

Attention is drawn to the danger of the introduction of piroplasmosis into Germany under war, and post-war conditions. The tick, *Dermacentor marginatus*, occurs in the Hessian marshes, Wurttemburg and the Danube basin, and in recent years *D. pictus* has been introduced on stock from France, and *Hyalomma marginatum*, *Rhipicephalus sanguineus* and *Rh. bursa* from Italy, whilst the immature stages of other species may be imported from great distances on migrating birds—*Haemophysalis leachi*, an African species, has been found on a stork.

*D. pictus* and *Rh. bursa* have been found to be capable of surviving the German winter in the open, and it is thought that *H. scupense* could do so, whilst *Rh. sanguineus* could also survive, as it infests buildings. Although *Babesia caballi* is the more resistant to cold, it was found that even *B. equi* could survive the Berlin winter in *Rh. bursa*.

Piroplasmosis of sheep has been recorded in Brandenburg, and while no information is available as to the tick transmitter, it is suggested that *Rh. bursa* may be established there. Attention is drawn to the cryptic form of equine piroplasmosis found to exist in France after the 1914–18 war, and the necessity for vigilance is emphasized, both as regards the occurrence of piroplasmosis and the introduction of alien ticks.—U. F. R.

RANDALL, J. B., & LAWS, S. G. (1947.) **Phenamidine in the treatment of *Babesia bigemina* infections of cattle.**—*Ann. trop. Med. Parasit.* **41.** 39–42. **939**

Nine cross-bred African cattle infected with *B. bigemina* by exposure to tick infestation were successfully treated with phenamidine isethionate [dihydroxyethane sulphonate]. On subsequent exposure to ticks two of the animals again developed transient infections, but recovered spontaneously.

Toxic effects were observed when the drug was given at a dose of 30 mg. per kg., and it is concluded that the dose should be accurately computed at the 15 mg. per kg. level. It was noted that phenamidine had no effect on *Theileria mutans* or *Anaplasma marginale* infections.—U. F. R.

*See also abst.* **1121** (trypanosomiasis and theileriasis).

ARNOLD, R. M. (1948.) **Resistance to tick-borne disease. [Correspondence.]**—*Vet. Rec.* **60.** 426. **940**

It is pointed out that in Jamaica, imported Brahmin cattle reared under tick-free conditions in the U.S.A., are subject to attacks of anaplasmosis, and/or piroplasmosis, equally severe as those in imported animals of European breeds. It is suggested that the resistance of Zebu cattle to tick-borne disease is actually due to premunity acquired during calfhood. In the case of anaplasmosis premunity is probably lifelong, most clinical cases being due to breakdown of premunity, but in the case of piroplasmosis immunity appears to fade after three or four years in the absence of re-infection.—U. F. RICHARDSON.

OGLESBY, W. T. (1948.) **Bovine anaplasmosis.**—*N. Amer. Vet.* **29.** 215–220. **941**

This is a brief general account of the disease and especially of gaps in our present knowledge. No specific treatment is available, detection of carriers is difficult and research work is hampered by lack of a small experimental animal susceptible to the disease.—M. C.

## DISEASES CAUSED BY VIRUSES AND RICKETTSIA

I. GALLOWAY, I. A., HENDERSON, W. M., & BROOKSBY, J. B. (1948.) **Strains of the virus of foot-and-mouth disease recovered from outbreaks in Mexico.**—*Proc. Soc. exp. Biol., N.Y.* **69.** 57–63. **942**

II. BROOKSBY, J. B., HENDERSON, W. M., & GALLOWAY, I. A. (1948.) **Strains of virus of foot-and-mouth disease recovered from outbreaks in Mexico. Identification.**—*Ibid.* **69.** 64–66. **943**

III. HENDERSON, W. M., GALLOWAY, I. A., & BROOKSBY, J. B. (1948.) **Strains of virus of foot-and-mouth disease recovered from outbreaks in Mexico. Pathogenicity and invasiveness.**—*Ibid.* **69.** 66–69. **944**

IV. BROOKSBY, J. B., GALLOWAY, I. A., & HENDERSON, W. M. (1948.) **Strains of virus of foot-and-mouth disease recovered from outbreaks in Mexico. Complement fixation tests.**—*Ibid.* **69.** 70–74. **945**

V. BROOKSBY, J. B., GALLOWAY, I. A., & HENDERSON, W. M. (1948.) **Strains of virus of foot-and-mouth disease recovered from outbreaks in Mexico. Serum neutralization tests.**—*Ibid.* **69.** 74–77. **946**

VI. HENDERSON, W. M., GALLOWAY, I. A., & BROOKSBY, J. B. (1948.) **Strains of the virus of foot-and-mouth disease recovered from outbreaks in Mexico. Vaccination experiments.**—*Ibid.* **69.** 77–84. **947**

I. The Research Institute (Foot-and-Mouth Disease Research Committee) at Pirbright has, during the past eight years, concentrated on the study of various characters of the virus of F. & M. disease by standard quantitative methods. As a result a new appreciation of the nature of these characters has been formed and, since these characters are probably shared by other viruses, workers not primarily concerned with F. & M. disease will find this series of articles of great interest.

The first paper is a general discussion embodying the results obtained in the succeeding papers and stressing the salient points. Strains of the same "immunological type", in the generally accepted sense of the term, can vary in spreading power, in invasiveness, in immunogenic potency and in pathogenicity. In addition, they may have minor but none the less important differences in antigenic make-up. Many of these properties of the virus have long been suspected by those who have had experience of the disease in the field. They seem to be independent of each other and, at the moment, little information is available as to how "fixed" they are. These characters have become apparent as a result of

carefully controlled experiments involving the use of numbers of cattle of relatively uniform and high susceptibility. Cattle with a "clean" history are essential and groups of Devon steers, one and a half to two years old, similar in condition, are selected.

Dosage of virus is determined by the inoculation on the tongues of two steers of tenfold dilutions. Each dilution is injected in five parallel, longitudinal lines on each tongue, there being four or five rows of lines each representing a different dilution. From the ten lines, five on each tongue, done with each dilution, the 50% end-point of the titration can be determined.

Contact experiments are usually made by exposing one animal to one donor in a box. Experience has shown that by exposing more than one animal to a single donor, the results of the test may be different. Cattle are examined daily for a definite number of days after inoculation or exposure and thereafter at regular intervals in order to note the time of development of lesions at different sites.

With the Mexican strains experiments were made to determine the titre of virus in blood and "lymph" and the value of the strains for the preparation of vaccines was examined. In addition, the antigenic composition was studied by cross-complement fixation and cross-serum neutralization tests. As a result evidence was obtained that two, at least, of the strains were not identical antigenically either with each other or with a standard strain of the same immunological type.

There is little doubt that species adaptation of the virus occurs. Strains of porcine origin sometimes have poor infectivity for cattle. Reference is made to a strain which spread readily amongst pigs but did not do so from pigs to cattle. In countries where susceptible wild animals exist, the disease may continue in a wild host for considerable periods. On transfer back to cattle, the strain may be in a modified form, possibly one of low invasiveness, and may leave in its wake animals with variable degrees of immunity. These animals may, in time, become reinfected, thus tending to modify the antigenic make-up of the strain.

At least two important conclusions can be drawn from this discussion. Firstly, for any country where the disease is not enzootic, the English "stamping-out" policy is the best method of control. Secondly, in other countries, vaccination should be regarded as a measure still largely in the experimental stage and should be subject to close laboratory supervision. The discussion suggests where many of the larger gaps in our knowledge of the disease lie.

II. Identification of the virus from Mexico as that of F. & M. disease was based on the results of inoculation of cattle, horses, donkeys, pigs, g. pigs and chick embryos, by fractional filtration experiments (particle size 8–12 m$\mu$) and by complement fixation tests. Typing tests were made in both g. pigs and cattle. Thirteen strains were examined: all were of the Vallée A immunological group.

III. Following inoculation on the tongue of cattle at Pirbright, the Mexican strains of virus produced infection with the same regularity as other strains. There appeared to be a tendency for delayed appearance of the secondary lesions, in many animals generalization was "incomplete and limited as regards the degree of involvement of the feet".

Intramuscular inoculation produced a severe generalized infection.

In titrations of tongue-epithelium suspensions of the Mexican strains the average 50% end-point was $10^{-6.1}$ for strain MP and $10^{-6.2}$ for strain M.1, as compared with $10^{-6.8}$ for strain 119, a stock cattle strain of A type. A peculiarity noted was the degree of difference between the reactions that occurred in the two steers that were used in some of the titrations. Titrations of defibrinated blood collected from cattle at the height of the reaction was somewhat low, $10^{-2.4}$ for MP and $10^{-2.9}$ for M.1 as compared with $10^{-3.5}$ for strain 119. This low titre for the blood may be correlated with the slower generalization and the tendency for generalization to be incomplete with the Mexican strains.

Further evidence of low invasiveness was found when cattle were exposed to single or repeated large doses of highly active virus by intranasal spray. Inapparent infections leading to partial or complete immunity developed in some animals.

Experiments on the spread of infection by contact showed that of 48 cattle exposed, 20 gave no apparent reaction. Seventeen of these developed a high-grade immunity. This occurrence is unusual, in the authors' experience, with other strains of virus and they consider it justifiable to refer to the Mexican strains as "of reasonably good spreading power but of low invasiveness". In some strains spreading power and invasiveness appear to be labile characters, in others fixed. An attempt to increase the invasiveness by rapid, intradermal, tongue passage was not successful.

IV. Complement fixation tests, using bovine virus as antigen and g. pig antisera, revealed that the Mexican strains MP and M.1 were not identical antigenically either with each other or with the stock A strain, 119. The experimental results emphasize "the importance of precision in

carrying out the test". The point at which differences in cross-fixation begin to affect cross-protection afforded by vaccines is, as yet, unknown.

V. Serum neutralization experiments were made with the pooled bovine convalescent sera of four animals and dilutions of virus. The mixtures were left for 30–90 min. and were then tested by inoculation on the tongues of two steers in a manner comparable to that used in determining the titre of a virus suspension. Dilutions treated with broth were tested in the same way. The difference between the two 50% end-points gave the amount of virus neutralized.

A useful method of expressing quantitatively the antigenic difference between strains, as found by neutralization tests, is suggested. The value, which may be called the "differential neutralization" between two strains, is the sum of the logarithmic differences in the amounts of virus neutralized by antisera prepared against two strains when they are tested, first against one and then against the other strain of virus. The differential neutralization between a Vallée O and a Vallée A strain was 4·6, between a Vallée A and a Waldmann C, 5·0 and between a Vallée A and a Waldmann C, 3·3. Within the A group differences were as follows :– between strain 119 and MP, 1·6, between MP and M.1, 1·5 and between M.1 and 119, 3·0. The difference between M.1 and 119 was, therefore, nearly as great as a type difference; but further work will be necessary on the quantitative factors influencing immunization before the significance of these findings can be assessed.

VI. The authors inoculated cattle with crystal violet vaccines prepared against the strains MP, M.1 and 119 and two to three weeks later tested the immunity of the cattle against the homologous and one or both of the other strains.

Vaccines were prepared by inoculating two to four steers on the tongue with the strain of virus and taking 4–5 l. of blood from the jugular vein 24–48 hours after inoculation. The blood was defibrinated, the samples pooled and a 1% solution of crystal violet was added to give a final concentration of 0·05%. The vaccine was inactivated by incubation at 37°C. for 6–8 days. The titre of virus in the blood was obtained by the usual method and the vaccine was tested for inactivation by observation of the effects of multiple tongue inoculations on a group of 8–12 cattle.

Groups of uniform Devon steers were then injected subcutaneously in the dewlap. Immunity tests were made by contact exposure and by inoculation on the tongue.

Interpretation of the results was made difficult by the low invasiveness of the Mexican strains of virus which caused incomplete reactions in the control groups of cattle. Nevertheless, they indicated the effectiveness of the type of vaccine employed and gave an indication of the immunogenicity of the Mexican strains. The differences in antigenic behaviour between strains MP, and M.1 were not so marked as those revealed in the complement fixation and serum neutralization tests. A potent vaccine prepared against strain 119 did not protect cattle against strain MP and in a footnote a further experiment is cited showing that even by increasing the dose of strain 119 vaccine the antigenic difference between this strain and the Mexican strains MP and M.1 could not be masked.

[These papers contain so much information, so tightly compressed, that it is quite impossible to do them justice in an abstract.]—J. R. HUDSON.

VEERARAGHAVAN, N. (1945.) **A rapid method for the diagnosis of rabies in animals.**—*Indian J. med. Res.* **33.** 295–297. **948**

In previous articles, the author has described a parasite found in the brain of rabid animals, regarded as a protozoon connected with the aetiology of rabies. It is now shown that cultivation of this parasite forms a ready means of diagnosing rabies when Negri bodies are not seen or when the brain is too putrid for animal inoculation. The medium is a simple one composed of 1% sheep or g. pig brain extract 6 parts, sheep or g. pig serum 1 part, distilled water 2 parts. To 8 ml. of the medium just before inoculation add 10 drops of fresh nerve tissue suspension from a 1–2 day old g. pig. Seed material is 2 ml. centrifugate of 20% suspension of suspected brain. Incubation is at 37°C. Every hour or so for 4–8 hours a smear of supernatant is made for Giemsa staining (one hour), shaking the tube well after taking the smear. Known + and — controls and uninoculated medium are included. Check tests are described to show the reliability of the method.
—F. C. MINETT.

HOLZ, K. (1947.) Zur Klärung der tollwutähnlichen Symptome bei staupekranken Hunden. Ein Beitrag zur serösen Gehirnentzündung der Tiere. **[Rabies-like symptoms in dogs with distemper.]** *Dtsch. tierarztl. Wschr.* **54.** 344–347. **949**

Attention is drawn to the similarity in symptoms which may occur in distemper when it affects the central nervous system, and rabies, and an outbreak of distemper in the North Rhine province is recorded in which two cases of biting occurred. It is pointed out that anti-rabies treatment of man sometimes causes paralytic accidents, and should only be used if it is unavoidable, and

it is therefore important to be able to distinguish histologically this form of distemper from rabies, as time does not allow resort to sub-inoculation.

The examination of the brains of five dogs involved, revealed a serous type of inflammation, which was sharply distinct from the perivascular round-celled infiltration which occurs in rabies. The brains appeared to be moist, the distension of the blood vessels, particularly the veins and capillaries, being visible with a magnifying glass, plasma exuded from them, and the cerebro-spinal fluid was increased. The vessels were filled with large numbers of nucleated cells, apparently originating from the vessel walls, a condition resembling leucostasis, the lumen being so blocked that plasma and erythrocytes could hardly pass, if at all. In areas of incomplete softening "Hortega" cells occurred, apparently microglia which had become granular. The tissues surrounding the vessels were distended with fluid.

The ganglion cells had suffered considerable damage as shown by the irregular staining of the protoplasm and nuclei; nuclear swelling, and vacuolization of the protoplasm. The ganglion cells might be partly or completely replaced by glial elements, or pure degenerative changes might occur without neurophagia. In one case a striking increase of the peri-cellular space had occurred.

It is pointed out that these findings do not agree with the classical description of the histo-pathology of distemper, which is described as a cellular inflammatory process similar to that of rabies.

Although the distemper lesions did not have the definite localization of those of rabies, they commonly affected the same areas, and this is thought to explain the similarity which may occur between the symptoms of the two infections.

—U. F. Richardson.

Bussell, L. J. (1945.) **Myelitis after antirabic vaccine. Report of a fatal case.**—*Lancet.* **251.** 826–827. **950**

A Sudanese soldier was bitten on the hand and ankle by a dog. It was not known whether the dog was rabid or not. Treatment, started at once, was by means of a carbolized vaccine made from sheep's brain. Seven daily injections were given. The patient then defaulted, but returned 21 days later when he said that the dog was rabid. He was given a further 18 daily injections. Four days after the last injection he had pain and twitching in the arm and shoulder. He was treated in hospital and died four days later. Sections of the hippocampus were negative for Negri bodies. Lesions which were diagnosed as acute haemorrhagic lymphocytic myelitis and spinal leptomeningitis were present. Brain material was injected subdurally into two rabbits both of which were alive and well two months later.

The cause of post vaccinal paralysis is discussed.—M. C.

Nagler, F. P. O., & Rake, G. (1948.) **The use of the electron microscope in diagnosis of variola, vaccinia, and varicella.**—*J. Bact.* **55.** 45–51. **951**

Using metal-shadowed micrographs the average size of the virus particles of varicella was found to be 210 m$\mu$ by 238 m$\mu$, and the average size of the particles of variola and of vaccinia 244 by 302 m$\mu$. By measuring a sufficient number of particles a differential diagnosis could be made. The source of the viruses did not influence their morphology under the electron microscope. In vesicle fluids from non-specific lesions no elementary bodies were seen resembling variola, vaccinia, or varicella. After irritation with tincture cantharides particles were present in the crust, but they appeared to be flatter than the virus particles.

—A. Mayr-Harting.

Fenner, F. (1948.) **The epizootic behaviour of mouse-pox (infectious ectromelia).**—*Brit. J. exp. Path.* **29.** No. 1. 69–91. **952**

Studies of the epizootic behaviour in mice of two strains of ectromelia virus, the "Hamstead" and "Moscow" strains, are described. Stock virus was prepared from infected chorio-allantoic membranes and virus titrations were carried out by the pock-counting method. First egg-passage material of the "Moscow" strain was used; the preparations of the "Hampstead" virus had undergone about 50 passages.

Natural ectromelia infection in mice occurred through small skin abrasions, the virus producing a local primary lesion after an incubation period of $6{\cdot}8 \pm 1{\cdot}7$ days in the case of the "Moscow" strain, and $8{\cdot}1 \pm 1{\cdot}4$ days with the "Hampstead" strain. Epidemics of mouse-pox occurring after the introduction of 15 infected mice to groups of 100 normal male mice were observed. With the more virulent "Moscow" strain, all exposed mice had signs of infection by the 22nd day, and the mortality rate was about 50%. The "Hampstead" strain was less infectious and less virulent; there were signs of infection in 60% of exposed mice between the 12th and 20th days, followed by a secondary series of cases (40%) between the 22nd and 28th days; the mortality rate was 15%. With material of substantially the same chorio-allantoic titre the $LD_{50}$ of the "Moscow" strain was about 1,000 times higher than that of the "Hampstead" strain after intraperitoneal inoculation, and 100,000 times higher after inoculation into the pads of the feet. After exposure to a similar amount of virus in a contaminated atmosphere for a period of 24 hours nearly three times

as many mice were infected by the "Moscow" as by the "Hampstead" virus. The first sign of clinical infection, marking the end of the incubation period, was variously a primary skin lesion, a secondary rash or death. The lesions and P.M. findings are described. In some instances there was no clinical or P.M. evidence of infection in the mice except the development of specific antibody: antibody levels were estimated by the haemagglutination inhibition test. Mice which survived the acute infection usually developed an extensive secondary rash, which generally appeared at approximately the tenth day of infection—about two days after the appearance of the primary lesion. The rash had healed generally by the end of the third week. The time of maximum infectivity was during the early stages of the secondary rash, the virus being eliminated chiefly in the discharges from the skin lesions.

Investigations of antihaemagglutinin titres in mothers and young showed that the degree of antihaemagglutinin response was determined largely by the duration and intensity of the antigenic stimulus, as evidenced by the severity of lesions of the skin and of the spleen. Antihaemagglutinin titres gave an accurate measure of protective antibody. Concerning the transfer of immunity from mother to offspring it was found that some antibody passed through the placenta but a much larger quantity was transmitted in the milk. The antibody titres of the sera of foetuses from a pregnant mouse just before term were only one-tenth as high as that of the mother. After being suckled by an immune mother for a few days, however, the antibody titre of the young rose to a level half as great as that of the nursing mother. Following weaning on the 21st day detectable antibody disappeared by the end of the sixth week. Young mice which had been suckled by mouse-pox-immune mothers survived 1,000 times the dose of virus which killed all mice of the same age suckled by normal mothers.

A serological survey of 13 batches of wild mice from different parts of Victoria (Australia) showed no evidence of mouse-pox infection in that State.—CLIVE BRIGGS.

I. FENNER, F. (1947.) **Studies in infectious ectromelia of mice. I. Immunization of mice against ectromelia with living vaccinia virus.—II. II. Natural transmission: The portal of entry of the virus.**—*Aust. J. exp. Biol. med. Sci.* **25.** 257–274; & 275–282. **953**

I. This paper elaborates Burnet and Boake's (1946) observation that mice could be immunized against ectromelia by the intravenous inoculation of vaccinia virus.

The effect of vaccinia inoculation in mice was studied using various strains of vaccinia, different routes of inoculation, and mice of varying ages. It was found that dilute suspensions of virus given by intranasal inoculation caused no symptoms, but antibody could be detected within six days, reaching its maximum titre by the tenth day. Both young and adult mice treated in this way had a high degree of immunity to a challenge dose of ectromelia and this was considered to be the best immunizing method.

II. In experiments designed to trace the natural method of spread of this disease it was found that infection through minute abrasions of the skin gave a clinical and P.M. picture similar to that seen in naturally infected mice. Infection can occur by other routes but the skin is considered to be the usual portal of entry.—N. WICKHAM.

LEIGH, A. D. (1946.) **Infections of the nervous system occurring during an epidemic of influenza B.**—*Brit. med. J.* Dec. 21st. 936–938. **954**

Nine cases of cerebral or cerebro-spinal infection during an epidemic of influenza are described. The cases occurred at the peak of the influenza epidemic and it is not known whether the prodromal symptoms were due to influenza or not. The cases, however, were suggestive of virus attack.—M. C.

DAVENPORT, F. M., & HORSFALL, F. L. (1948.) **The associative reactions of pneumonia virus of mice (PVM) and influenza viruses: the effects of pH and electrolytes upon virus-host cell combinations.**—*J. exp. Med.* **88.** 621–644. [Authors' summary copied *verbatim.*] **955**

Combination between PVM and erythrocytes as well as between the influenza viruses and erythrocytes is inhibited at low electrolyte concentrations. Combinations between PVM and lung particles as well as between the virus and erythrocytes can be dissociated in solutions of low electrolyte concentration. The rate of elution of influenza virus is decreased under similar conditions. PVM can combine with and be dissociated from erythrocytes repeatedly without affecting the combining capacity of the cells and does not possess an enzyme-like activity similar to that of the influenza viruses. Because dissociation depends on electrolyte concentration and pH, it appears that the PVM-cell component complex may be in the nature of a weak salt.

DEAN, D. J., & DALLDORF, G. (1948.) **The susceptibility of the hamster to mouse encephalomyelitis virus.**—*J. exp. Med.* **88.** 645–654. [Authors' conclusions copied *verbatim.*] **956**

The OT strain of mouse encephalomyelitis virus induces an inapparent infection in suckling hamsters associated with lesions of the central nervous system and skeletal muscles. The virus increases in pathogenicity after alternating mouse-

hamster transfers and then induces both paralysis and encephalitis. Pathogenicity is lost through serial hamster passages but is restored by a single mouse transfer.

DE GARA, P. F., & FURTH, J. (1948.) **Pneumonia produced by a meningopneumotropic virus. Report of a fatal case, with observations on the interrelationship of psittacosis-like viruses.**—*Arch. Path.* **45.** 474–493. [Authors' summary copied *verbatim.*] **957**

From the lung of a patient dying of atypical pneumonia a psittacosis-like virus was isolated. Control experiments indicate that this virus is neither a saprophyte in mice nor is it an inhabitant of the throat or the lungs of the normal human being.

The histologic changes in the lung of the patient were similar to those produced by the viruses of the psittacosis group, and a survey of the literature disclosed no marked differences between psittacosis and psittacosis-like pneumonias.

The experimental pneumonia produced in mice by this virus was predominantly alveolar, with some interstitial consolidation. The cells of the exudate were polymorphonuclear leukocytes and large mononuclear cells. The inflammation was characterized by the presence of abundant spherical elementary particles, free and within the cells of the exudate, during the first two weeks of illness. During the second week a perivascular lymphoid infiltration developed, which gradually increased in intensity and persisted after disappearance of the elementary particles and resolution of the alveolar exudate.

The virus isolated by us is highly pathogenic for mice by the intracerebral route, almost as pathogenic by the intranasal route and is but slightly pathogenic by other routes. It is present in the blood of infected mice for at least three weeks. It is slightly pathogenic for rats and guinea pigs and is moderately susceptible to penicillin.

Immunologic studies have shown that the psittacosis-like agents variously designated as meningopneumonitis, ornithosis and human pneumonitis either are indistinguishable or exhibit only minor antigenic differences. Hence it is proposed to name them all psittacosis-like viruses. Since these agents seem to require living cells for multiplication but are visible, as are rickettsias, it is proposed to group them under the collective term "cytomicrobes".

DAVISON, G., & NEUBAUER, C. (1948.) **Meningoencephalitis in man due to the louping-ill virus.** —*Lancet.* **255.** 453–457. [Authors' summary copied *verbatim.*] **958**

Two cases of louping-ill in man are reported with evidence suggesting that the infection was acquired naturally and not in the laboratory as in previous cases.

The clinical picture of louping-ill in man is that of meningo-encephalitis, usually following a prodromal influenza-like illness and followed by complete recovery in most cases.

It is suggested that the illness would be more often diagnosed if it were suspected whenever a meningo-encephalitis appears in a person exposed to louping-ill virus.

The evidence linking louping-ill with Russian spring-summer encephalitis is given.

REEVES, W. C., WASHBURN, G. E., & HAMMON, W. McD. (1948.) **Western equine encephalitis control studies in Kern county, California, 1945. I. The effectiveness of residual DDT deposits on adult *Culex* mosquito populations.** —*Amer. J. Hyg.* **47.** 82–92. [Authors' summary copied *verbatim.*] **959**

HAMMON, W. McD., & REEVES, W. C. (1948.) **Western Equine encephalitis control studies in Kern county, California, 1945. II. An evaluation of the effectiveness of certain types of mosquito control including residual DDT on virus infection rates in *culex* mosquitoes and in chickens.**—*Ibid.* **47.** 93–102. [Authors' summary copied *verbatim.*] **960**

I. It was observed in two separate areas that apparent population trends of *Culex tarsalis* and *Culex quinquefasciatus* were distinctly different. *C. tarsalis* decreased rapidly in number preceding a noticeable fall in summer temperatures, while *C. quinquefasciatus* were still increasing.

It appears that residual DDT deposits on the walls of buildings which serve as resting places for *Culex* mosquitoes were quite effective in reducing the number of resting mosquitoes within the sprayed buildings.

Much of the DDT in solution in Diesel oil when sprayed on unpainted, dry wood at a rate of 200 milligrams of DDT per square foot, was carried below the surface, leaving almost no detectable or effective residual surface deposit after a very short period of time (less than 6 to 8 weeks). In a quick breaking xylene-water emulsion, a better surface deposit of DDT was obtained and was effective over a longer period of time (at least 2·5 months).

Any suitable micro-habitat left unsprayed in a building (upper surface of boards or rafters, between shingles, inside of boxes, etc.) or the unsprayed surface of any article introduced after treatment, could usually be found harboring mosquitoes, often in fairly large numbers. Complete coverage with DDT spray was essential for com-

plete control, though it proved to be impractical in some instances. Costly, though limited, larval control measures plus residual DDT spraying of most buildings and known favorite resting places of mosquitoes about domestic habitats, as performed in area B, apparently caused only a moderate reduction in the population of *Culex* mosquitoes over the area as a whole. Although no way was devised to measure the change in total population in any of the areas, observation led us to suspect that there was no reduction of a nature that would be significant in the reduction of a mosquito-borne infection unless local mosquito reduction in chicken houses (which was 90 to 95 per cent effective) was of specific importance. This aspect is considered in the following paper (II).

II. Western equine virus infection rates remained high in *Culex tarsalis* collected within the areas where DDT residual sprays for adult mosquito control and larviciding measures were carried out.

Judging from the very small numbers of *C. tarsalis* found in DDT-treated chicken houses it seems probable that many infected mosquitoes found in other shelters were infected from wild birds or other hosts within the experimental area.

Contrary to expectations *C. tarsalis* frequently obtained blood from chickens in DDT-sprayed shelters and lived at least long enough to be caught while resting outside of the sprayed chicken houses.

A comparison of Western equine virus infection rates in samples of mosquitoes from areas A and B indicates a lower rate within the latter area where more extensive (adult and larval) mosquito control was carried out. The difference shown is just below the range of significance and it is possible that similar differences in infection rates would have occurred in these two areas (20 miles apart) if no mosquito control had been carried out.

Inexpensive or moderately expensive mosquito control (as carried out in areas A and B, respectively) did not appear to eliminate or greatly decrease virus infection rates in the remaining mosquitoes.

A serum-neutralization test survey of young chickens (less than 1 year of age) failed to demonstrate, on the basis of the samples tested, that a material reduction in the number of resting mosquitoes in chicken houses resulted in a proportionate decrease or even a significant decrease in the incidence of infection in the birds. Thus, an original hypothesis which this study was set up to test, did not receive experimental support.

We appear to have erred in assuming that most *Culex* mosquitoes feeding on chickens would come to rest on the sprayed surfaces and remain until receiving a lethal amount of DDT. Precipitin tests indicated that many mosquitoes found outside chicken houses had fed on chickens and apparently had avoided, or at least temporarily escaped, the effect of DDT.

Immunity rates in chickens and infection rates in mosquitoes were not significantly lower in area B, with more complete mosquito control, than they were in area A, with less complete control.

Neither did DDT residual spraying eliminate equine encephalomyelitis, as one case occurred in the center of area A. Human and equine clinical infection rates for the county were too low to lend significance to the absence of additional cases in the two study areas.

GERASIMOVICH, P. P., & ULENDEEV, A. I. (1944.) **[Comparative evaluation of various methods of treatment of equine encephalomyelitis.]**—*Veterinariya, Moscow.* No. 5–6. pp. 20–21. **961**

The authors tested the effect of various agents against equine encephalomyelitis and a table gives the percentage of cures. The authors state that the most effective, each with over 80% of cures, were swine fever anti-serum or the blood of convalescent horses along with, in each case, urotropine and spirit of camphor. The method of treatment and a number of typical cases are described.

Owing to the variability of the virus causing encephalomyelitis the best results are obtained when using convalescents' blood from horses in the locality where the disease has appeared.—S. S.

KOPROWSKI, H., & COX, H. R. (1947.) **Human laboratory infection with Venezuelan equine encephalomyelitis virus. Report of four cases.** —*New Engl. J. Med.* **236.** 647–654. [Abst. in *Bull. Hyg. Lond.* **22.** 561, copied *verbatim.* Signed: D. J. Bauer.] **962**

The authors report 4 cases of infection amongst laboratory workers. Symptoms resembled those described in previous laboratory infections; two cases were mild, one moderate and one severe. Two cases were of interest in that the persons concerned had no known exposure to the virus and presumably acquired the infection by the inhalation of air-borne material.

ANON. (1948.) **Kenya. F. A. O. Nairobi Meeting on rinderpest. Summary of conclusions.** pp. 4. Nairobi: F. A. O. [Mimeographed.] **963**

An international conference organized by F.A.O. was held from Oct. 28th–Nov. 1st, 1948, at Nairobi following an African conference organized by the Colonial Office.

Daubney, R., read a paper on goat virus vaccine and Cheng, S. C., papers on the lapinized

and avianized vaccines; these papers are to be published later. Shope, R. E., opened a discussion on inactivated tissue vaccines.

A summary of the conclusions of the conference has been circulated. Important points in the conclusions are as follow:—It is considered that the vaccines now available make the eradication of rinderpest a practical possibility and that eradication should be carried out without further delay.

Inactivated tissue vaccine is not recommended for general use [one of the reasons given, namely, "danger of spreading the disease due to the occurrence of atypical and therefore unrecognized cases which occur during the period of immunity following vaccination" is probably of importance only in the case of importation of cattle from an infected into a clean area].

The goat virus vaccine is considered to be the most stable and suitable vaccine for stock with a degree of natural resistance.

The lapinized vaccine is considered to be less virulent than the goat virus vaccine and is said to have given good results in China. Further work in other countries should be carried out as soon as possible.

The avianized vaccine is said to have been used with great success in China, it caused less reaction than any other living virus and no deaths. Further research to improve the keeping quality is necessary. It is possibly the best vaccine for cattle of highly susceptible breeds.

Earlier dissemination of information on new developments in technique and research is necessary.

International co-operation in control especially in regard to boundaries is very necessary.

Special problems of control exist in certain African territories, namely the Anglo-Egyptian Sudan, Eritrea, Ethiopia and Somalia and assistance by F.A.O. with regard to finance, personnel and supply of vaccine is envisaged. Overstocking as a result of control of rinderpest is a danger in some areas and organization for marketing and utilization of surplus stock is necessary.

The summary of the conclusions, being already condensed, is difficult to abstract and should be read in the original. [Although the danger of spread of infection which might arise from the use of inactivated tissue vaccine is stressed there is no mention of possible danger of spread by any of the living vaccines.]—M. C.

MA, W. T. (1944.) **[Experiment on the production of dry rinderpest vaccine.]**—*Chin. J. Anim. Indust.* **2.** 5–8. **964**

A description of the method of preparing tissue vaccine for immunization against rinderpest. Emphasis is laid on the economy of using the residue of spleen and lymph nodes after expressing the juice for vaccine. The residue was extracted and dried.—S. J. CHU.

KOPROWSKI, H., JAMES, T. R., & COX, H. R. (1946.) **Propagation of hog cholera virus in rabbits.**—*Proc. Soc. exp. Biol., N.Y.* **63.** 178–183. **965**

Using an alternating passage method the authors claim to have passaged swine fever virus in rabbits for twelve consecutive passages. The strain of virus used was obtained from The Lederle Laboratories. Pigs were obtained immediately after weaning from farmers whose premises were known to be free from swine fever and who did not use swine fever vaccine. The rabbits were inoculated intravenously. It was essential to take the temperatures of the rabbits frequently day and night and to make transfers promptly at the time the febrile response occurred. Except for the febrile response no other symptoms were observed in the rabbits.—M. C.

BAKER, J. A. (1946.) **Serial passage of hog cholera virus in rabbits.**—*Proc. Soc. exp. Biol., N.Y.* **63.** 183–187. **966**

The successful adaptation of the rinderpest virus to rabbits [*V. B.* **16.** 262] induced B. to attempt the adaptation of the swine fever virus. Two strains of swine fever virus were used, the infective material was a 10% emulsion of spleen tissue from an infected pig killed at the height of illness, and the rabbits were inoculated intravenously. In the first rabbit passage 0·01 g. of rabbit spleen tissue in the case of virus A would infect pigs, while 0·001 g. would not; in the case of virus B, 0·1 g. would infect but 0·01 g. would not. In subsequent rabbit passages there was a decrease in virulence for pigs, so that from the 10th to the 15th passages rabbit spleen material produced only fever of short duration when injected into pigs and on subsequent test inoculation with fully virulent material the pigs were found to be immune.

In none of the rabbits inoculated with either of the two strains was there any temperature reaction in early passages, but in later passages slightly increased temperatures were observed. Strain B virus was less adaptable to rabbits than strain A, and required six alternating passages before it could be transferred serially in rabbits.

Neither strain produced any illness in the rabbits.—M. C.

BOYNTON, W. H., TAKAHASHI, W. N., WOODS, G. M., & WALKER, W. W. (1948.) **Further studies on propagation of hog cholera virus in vitro including electron micrographs.**—*Vet. Med.* **43.** 403–406. **967**

A modification of Simms-Sanders' serum

ultrafiltrate method of tissue culture was used to propagate swine fever virus to the 89th generation. The earlier generations of the series were extremely virulent for pigs. A loss of virulence was noted after the 52nd generation and pigs which resisted inoculation of culture virus developed an immunity.

Virus culture suspensions were purified and prepared for electron microscopy by ultracentrifugation and by ammonium sulphate precipitation techniques, both of which are described in detail. The concentrates prepared from inoculated culture media were capable of immunizing pigs against swine fever, and electron micrographs of the concentrates revealed aggregations of minute white granular particles about 5 m$\mu$ in diameter. These particles were presumed to represent the swine fever virus. In concentrates prepared from unseeded culture media the presence of white particles was not observed under the electron microscope, nor were they capable of producing an immunity in pigs.—CLIVE BRIGGS.

EATON, M. D., DOZOIS, T. F., VAN ALLEN, A., PARISH, V. L., & SCHWALM, S. (1948.) **Studies on inhibition of the agents of murine and feline pneumonitis by penicillin.**—*J. Immunol.* **58.** 251–267. **968**

The minimal effective dose of penicillin and the completely viricidal dose was studied, using chick embryos infected with the causal agent of mouse virus-pneumonia and cat virus-pneumonia. Both infections, but especially the former, were susceptible to immediate treatment, and even after a period of days proliferation could be inhibited or, in some cases, eradicated. The ratio of viricidal dose to minimal dose was 20 : 1 for the mouse virus and 100 : 1 for the cat virus. The amount of penicillin required was proportional to the amount of virus, and the longer the delay before treatment, therefore, the larger was the dose required.—J. KEPPIE.

ANDREWS, W. H. (1948.) **Fowl pest. A note on the characters of the present epizootic.**—*Vet. Rec.* **60.** 33–34. **969**

The first outbreak of the 1948 epizootic of Newcastle disease in England was diagnosed in Feb., 1947. The incidence increased slowly during March, rapidly in April and more rapidly in May. Control measures resulted in a decline during July and August, but in September the outbreak again assumed serious proportions.

All types of flocks were affected. Approximately three-quarters of the confirmed outbreaks were in small domestic flocks; only a small number of good breeding flocks were affected.

It was believed that the infection was introduced with frozen poultry carcasses from Central Europe.

The commonest method of infection at the beginning of the outbreak was by ingestion of uncooked poultry offal. Once the infection was established, the most important part in spreading the disease was played by dealers and markets. The symptoms, lesions and differential diagnosis are discussed.—F. D. ASPLIN.

DE LAY, P. D. (1947.) **Isolation of avian pneumoencephalitis (Newcastle disease) virus from the yolk sac of four-day-old chicks, embryos, and infertile eggs.**—*Science.* **106.** 545–546. **970**

Virus was isolated from the yolk sac of six 4-day-old chicks, which had been hatched from eggs laid when production was severely depressed as a result of Newcastle disease. Clinical evidence of disease was not observed in the flock of chicks until several days after the six birds from which the virus was isolated had been examined.

Newcastle disease virus was isolated from the yolk sacs of embryos which had died on the 15th day of incubation, from eggs laid by the same hens during the convalescent period.

Virus was also isolated from the pooled content of 13 infertile eggs which had been incubated for seven days.—F. D. ASPLIN.

BANKOWSKI, R. A., & BOYNTON, W. H. (1948.) **Preliminary report on the propagation of avian pneumoencephalitis virus (Newcastle disease) *in vitro*.**—*Vet. Med.* **43.** 305–306. **971**

Newcastle disease virus was cultivated in a modification of Simms-Sanders medium, in which bovine or fowl serum replaced pig serum and chick embryo liver or heart replaced pig bone marrow.

Inoculated tissue cultures were incubated at 37°C. for 72 hours and then kept 24 hours or longer at room temperature. Newcastle disease virus was successfully carried through ten serial passages in this manner. Tissue culture propagated viruses failed to agglutinate chick cells.

Virus propagated in the bovine serum media had a tendency toward loss of virulence for chickens. Embryo infective titres of tissue culture virus fluctuated considerably, titres of $10^{-5}$ or $10^{-6}$ were obtained with some degree of regularity.

—F. D. ASPLIN.

CORBETT, A. C., & FADDOUL, G. P. (1948.) **Reflections on the respiratory virus diseases of chickens.**—*Vet. Med.* **43.** 239–242. **972**

A general discussion on the epidemiology of virus respiratory diseases of fowls.—F. D. ASPLIN.

RAKE, G. (1947.) **The initial body and the plaque form in the chlamydozoaceae.**—*J. Bact.* **54.** 637–640. **973**

Electron micrographs of the agent of feline pneumonitis were studied with a view to determining the significance of the initial bodies and

plaque forms which represent stages in the developmental cycles of the Chlamydozoaceae (lymphogranuloma-psittacosis group of agents). 0·5% of all the bodies studied were well outside the range of size found for elementary bodies, and were believed to represent initial bodies. Closely-packed groups of elementary bodies, presumed to be colonies of elementary bodies, were also seen: the "capsular" matrix forming the plaque which normally surrounds the colonies was believed to disintegrate readily and so disappeared during the preparation of the screens for electron microscopy.—CLIVE BRIGGS.

CASPERSSON, T., & HYDÉN, H. (1945.) Högre virusarters förökning. **[The multiplication of the higher viruses.]**—*Nordisk. Med.* **28.** 2631–2636. [English summary.] [Abst. in *Bull. Hyg., Lond.* **21.** 255, copied *verbatim.* Signed: D. J. BAUER.] **974**

Sections of tissues infected with certain viruses were examined with ultraviolet light to determine the location of deposits of nucleotides, which strongly absorb the wavelength used (2600 Å).

In molluscum contagiosum, the stages leading to the formation of the inclusion body were studied; an increase in protein content of the cytoplasm of the infected cell appears first of all, followed by a net-work of absorbing substance (deoxyribose nucleotide) which at length fills the whole cell, forming the molluscum body.

A similar sequence of events is seen in cells infected with the virus of verruca vulgaris, except that the deposit of deoxyribose nucleotide is intranuclear. The primary increase in protein content of the cell cytoplasm seen with both these viruses suggests that they exploit the normal mechanism of protein synthesis of the host cell. The nucleotides which appear are not normal cell constituents.

In the Purkinje cells of rabbits infected with rabies, deoxyribose nucleotides and proteins accumulate in the nucleus as a ring of particles which at first surrounds the nucleolus and later fills the whole nucleus. The proteins of the cytoplasm become depleted.

In the anterior horn cell infected with poliomyelitis virus, ribose nucleotides accumulate in the nucleus and also in the cytoplasm. Ribose nucleotides appear in the smaller viruses, whereas the larger ones contain deoxyribose nucleotide; the presence of the latter may be correlated in some way with greater complexity of organization, and is likened by the authors to the chromosome apparatus of higher organisms.

GAULD, R. L. (1947.) **Field studies relating to immunity in infectious hepatitis and homologous serum jaundice.**—*Amer. J. publ. Hlth.* **37.** 400–406. **975**

Two outbreaks of infectious hepatitis occurred in American troops in the Mediterranean theatre in successive winters. There was a significant difference of incidence in the second outbreak between personnel present at the time of the first outbreak and those who arrived later. This suggests that exposure to the disease, not necessarily accompanied by a clinical attack, may induce the development of resistance which may not be permanent. While homologous serum jaundice and infectious hepatitis are clinically similar there was no evidence that those who developed jaundice after yellow fever vaccination had greater resistance to infectious hepatitis. The two viruses although related may differ antigenically.—K. G. TOWERS.

I. GREENBERG, M., PELLITTERI, O. J., & JELLISON, W. L. (1947.) **Rickettsialpox—a newly recognized rickettsial disease. III. Epidemiology.**—*Amer. J. publ. Hlth.* **37.** 860–868. **976**

II. HUEBNER, R. J., JELLISON, W. L., & POMERANTZ, C. (1946.) **Rickettsialpox—a newly recognized rickettsial disease. IV. Isolation of a rickettsia apparently identical with the causative agent of rickettsialpox from *Allodermanyssus sanguineus*, a rodent mite.**—*Publ. Hlth. Rep., Wash.* **61.** 1677–1682. **977**

III. HUEBNER, R. J., JELLISON, W. L., & ARMSTRONG, C. (1947.) **Rickettsialpox—a newly recognized rickettsial disease. V. Recovery of *Rickettsia akari* from a house mouse (*Mus musculus*).**—*Ibid.* **62.** 777–780. [Authors' summaries copied *verbatim.*] **978**

I. The epidemiologic features of an outbreak of rickettsial pox in a housing development in New York City are discussed. Evidence is presented that the disease is caused by *Rickettsia akari*; that it is transmitted by a rodent mite, *Allodermanyssus sanguineus*; and that the house mouse, *Mus musculus*, acts as a reservoir. The presence of mouse harborages in the basements was responsible for maintenance of the infection. Incinerators, especially since they were not fired nor cleaned frequently, served as sources of food for the mice and must be considered as a factor in the maintenance of the animal reservoir of the disease.

II. The recovery of a rickettsia (mite strain No. 1) from a saline suspension of the tissues of mites (*Allodermanyssus sanguineus*) has been described. A rickettsia (mite strain No. 2), which is morphologically, culturally, and serologically indistinguishable from mite strain No. 1, has been isolated from a mouse "bitten" by *A. sanguineus.*

The behavior of the two mite strains in pro-

ducing disease in guinea pigs, mice, and chick embryos, and as antigens in the complement-fixation test would seem to establish them as identical with the M.K. strain of rickettsialpox. Further evidence of this identity has been provided by the solid immunity afforded guinea pigs by reckettsialpox against one of the mite strains.

The recovery of apparently identical strains of rickettsia from a man ill with rickettsialpox and from bloodsucking mites collected from the domicile of the same man indicates that human infection is acquired from the mites, probably through biting.

The isolation of this agent from mites has established further its characteristics as a micro-organism of the rickettsial group. The name *Rickettsia akari* (Greek, mite) is proposed.

III. *Rickettsia akari*, the causative agent of rickettsialpox was recovered from the tissues of a naturally infected house mouse (*Mus musculus*) trapped at the site of an outbreak of the disease.

ANON. (1944.) **Cultivation of South African rickettsiae in developing chicks and the preparation of vaccines from their membranes.**—*S. Afr. J. med. Sci.* **9.** 1–20. **979**

Using strains of epidemic and endemic typhus and a tick-borne infection, preliminary experiments as to the value of egg-culture vaccine were undertaken prior to large-scale production. Vaccines were prepared by grinding the infected chorio-allantoic and yolk sac membranes with an equal weight of alundum, adding saline, centrifuging and adding 0·2% formol saline to the supernatant fluid; evidence had previously been obtained that bacteria and rickettsiae ground in a mortar with alundum are disintegrated.

Dilute vaccines did not protect g. pigs against infection with epidemic strains, but gave partial protection against endemic strains and complete protection against the tick-borne infection. A more concentrated vaccine gave protection against any thermal reaction when tested with epidemic typhus, but some animals developed Neill-Mooser reactions.

In the course of these experiments it was found that egg tissues remained infective at room temperature for three hours, but that when dried and sealed *in vacuo* they remained infective for at least six months. Strains of rickettsiae when passaged through eggs undergo alterations shown by a shortened incubation period and a more intense Neill-Mooser reaction. For the examination of egg tissue for rickettsiae a modified Machiavello technique is recommended, impression preparations being cleared with benzene, fixed in methyl alcohol, stained with a buffered solution of basic fuchsin in methyl alcohol and, after washing, being decolorized with 0·5% aqueous citric acid and counter stained with methylene-blue.—U. F. RICHARDSON.

BECK, M. D., BELL, J. A., SHAW, E. W., & HUEBNER, R. J. (1949.) **Q fever studies in Southern California. II. An epidemiological study of 300 cases.**—*Publ. Hlth Rep., Wash.* **64.** 41–56. [Authors' summary copied *verbatim.*] **980**

Three hundred cases of Q fever, with three deaths, have been investigated in Los Angeles and vicinity since September, 1947. The method of case finding has been described and the general clinical and laboratory findings and diagnostic criteria discussed. Four hundred eighty-three complement fixation tests were made and in general, the titers increased from zero to a peak during the fourth week of illness and then tended to gradually subside over a period of years. The cases occurred throughout the areas at all seasons and over several years. They were predominantly males in the industrial age groups, however their occupations were extremely diversified. In all, the epidemiological findings suggested three general hypotheses as to the modes of spread of the disease in this endemic area—occupation in the dairy or livestock industries, residence in close approximation to a dairy or livestock yards, and household use of raw milk. No one of these possible modes of spread would account for more than one-half of the cases. Specific epidemiological studies have been arranged to determine the worth of each of these hypotheses.

*See also absts.* **1003** (papillomatosis); **1004** (multiple infections of single host cells); **1005** (fibroma virus); **1006-1008** (chicken tumours); **1021** (poliomyelitis); **1032** (comparative neuro-pathology of mammals); **1062** (action of viruses on red blood cells); **1121** (rinderpest in East Africa); **1121** (lumpy skin disease); **1125** (swine fever and foot and mouth disease).

## IMMUNITY

KABAT, E. A., BAER, H., BEZER, A. E., & KNAUB, V. (1948.) **Immunochemical studies on blood groups. VII. Chemical changes associated with destruction of blood group activity and enhancement of the type XIV cross-reactivity by partial hydrolysis of hog and human blood group A, B, and O substances.**—*J. exp. Med.* **88.** 43–57. [Authors' summary copied *verbatim.*] **981**

The effect of heating at varying pH on the cross-reactivity of hog blood group A and O substances with Type XIV antibody has been investigated. The hydrolysis of blood group A, B, and O substances from hog and human sources

at pH 1·5–1·8 resulted in destruction of blood group activity and a marked increase in cross-reactivity with Type XIV antipneumococcus horse serum.

Analysis revealed the liberation of reducing sugar, most of which was dialyzable. It was further shown that the major part of the reducing sugar was fucose with small amounts of free and polymerized galactose and glucosamine. Non-glucosamine nitrogen, probably amino acids, also was found in the dialysate.

Paper chromatographic separation of the concentrated dialysate confirmed the presence of fucose and showed that the majority of the galactose and glucosamine occurred in polymeric form.

Quantitative analysis of the substances isolated from the paper showed good recovery of the various components indicating that practically all of the material in the dialysate could be accounted for.

The methylpentose of human blood group A substance was identified as fucose.

The structure of the blood group substances is interpreted in terms of these results.

FRIEDLAENDER, S., & FRIEDLAENDER, A. S. (1948.) **Experimental and clinical studies of neohetramine, a new antihistaminic agent.**—*J. Lab. clin. Med.* **33.** 865–868. [Authors' summary copied *verbatim.*] **982**

Neohetramine, [2-(N-dimethylaminoethyl-N-p-methoxybenzyl)-aminopyrimidine monohydrochloride], prevented fatal shock from intravenous histamine in the intact guinea pig. A similar protective action was demonstrated in guinea pig anaphylaxis.

Oral administration of the drug afforded symptomatic relief to many patients with seasonal and nonseasonal allergic rhinitis, allergic dermatoses, asthma, urticaria and angioneurotic edema.

A relatively low incidence of side effects occurred with the use of Neohetramine. It was found particularly useful in patients unable to tolerate other antihistaminic drugs.

WINTER, C. A. (1947.) **A study of comparative antihistaminic activity of six compounds.**—*J. Pharmacol.* **90.** 224–232. **983**

The drugs were tested in g. pigs for antihistamine activity against intravenous histamine, inhalation of histamine aerosol, and on intestinal strips against histamine *in vitro*. The compounds, in descending order of potency, were :– neoantergan (N′-(*p*-methoxybenzyl)-N′-(2 pyridyl)-N, N-dimethylethylene diamine); pyribenzamine (N′-(2 pyridyl) N′-benzyl-N, N-dimethylethylene diamine; 3015RP (N-(β-dimethylaminoethyl)-phenothiazine; 3277RP (N-(β dimethylamino-α-methyl- ethyl) - phenothiazine; benadryl (β - dimethylaminoethyl-benzohydryl ether and hetramine (N′-benzyl-N′-(2-pyrimidyl)-N, N-dimethylethylenediamine.

Although three of the compounds had a lower acute toxicity than neoantergan, the therapeutic ratio was highest for that compound. Side reactions were least after neoantergan, and most violent after 3277RP. Delayed deaths were observed after single injections of 3277RP and benadryl.—J. M. ROBSON.

*See also absts.* **859** (phagocytosis); **874** (antihyaluronidase); **877** and **878** (tuberculin sensitivity); **890** (tuberculin); **892** (chromogenic acid-fasts as a vaccine for TB.); **906** (brucellosis); **922** (the bacterial cell and immunity); **928** (trypanosomiasis); **946** and **947** (foot and mouth disease); **953** (ectromelia); **963** and **964** (rinderpest); **965** and **966** (swine fever); **975** (infectious hepatitis); **979** (rickettsial diseases); **995** and **996** (helminthiasis); **1068** (cellular antigens in blood of cattle).

## PARASITES IN RELATION TO DISEASE [ARTHROPODS]

SCHNEIDER, R. (1948.) Necidol als Läusebekämpfungsmittel. **[Neocidal as delousing agent.]**—*Schweiz. Arch. Tierheilk.* **85.** 453–455. **984**

A brief note on trials said to have been made with neocidol the nature of which is not stated. Dusted on louse infested clothing in the form of a powder or used as an emulsion it was a useful insecticide. It was also useful for delousing horses in winter when the coats were long.—L. D.

DE MEILLON, B. (1946.) **Effect on some blood sucking arthropods of 'Gammexane' when fed to a rabbit. [Correspondence.]**—*Nature, Lond.* **158.** 839. **985**

A rabbit was fed 50 mg. of the gamma isomer of hexachlorocyclohexane (gammexane) in agar daily and its blood was found to be toxic to *Cimex lectularius, Aedes aegypti* and *Ornithodoros moubata.* Details are given of the amounts of the drug required to make the blood toxic.—LEWIS DAVIES.

STARKOFF, O. (1942.) Sul potere patogeno delle larve di *Gasterophilus intestinalis* (De Geer, 1776): contributo sperimentale ed anatomo-patologico. **[On the pathogenic power of the larvae of *G. intestinalis*: an experimental and anatomopathological contribution.]**—*Riv. Biol. colon.* **5.** 89–106. [Abst. in *Rev. appl. Ent.* Ser. B. **36.** 31 (1948), copied *verbatim.*] **986**

The author reviews the literature on the effect on horses of infestation of the stomach by larvae of *Gastrophilus intestinalis*, Deg., and describes his own observations. The larvae have been considered to contain a substance that is toxic to horses; but in the experiments described, aqueous extracts of larvae of *G. intestinalis*, at a dilution of 1 : 10 by weight, injected into rabbits

in 10 cc. doses intraperitoneally and intravenously on alternate days for more than a month, caused no general toxic symptoms, no anaphylactic reactions and no modification of the red blood corpuscles, though they caused some eosinophilia in the peripheral blood and considerably more in the marrow. He concludes that the harmful effects of the infestation in horses are due to the ulceration of the stomach by the larvae.

GORDON, H. McL. (1946.) **Tick paralysis. [Correspondence.]**—*Lancet.* **251.** 735. **987**

G. refers to an earlier editorial article in which it was stated that "salivary glands have been suggested as the source of toxin" and points out that the work of both CLUNIES ROSS [*V. B.* **6.** 159] and OXER & RICARDO [*V. B.* **13.** 358] has shown that the salivary glands of ticks are sources of the toxin. Injection of glands from engorged ticks produces paralysis in mice and this method is used in Australia to determine the titre of antitoxic serum which is produced from immune dogs. The serum is used for treatment of tick paralysis in dogs and has been used successfully in several cases in man.—M. C.

VAN GREMBERGEN, G. (1947.) De nieuwe Insecticieden DDT en HCH en hunne aanwending tegen de Duiventeek, *Argas Reflexus.* **[Gammexane and D.D.T. for control of *Argas reflexus.*]**—*Vlaam. Diergeneesk. Tijdschr.* **16.** 119–124. [English & French summaries. Abst. from English summary.] **988**

Gammexane is superior to D.D.T. for control of arachnids, especially *Argas reflexus.* D.D.T. in a 10% concentration is toxic only to starving larvae. A 5% gammexane powder is, however, toxic to all developmental stages whatever may be their state of nutrition. A 2 min. contact is sufficient to damage the larvae irretrievably; after one hour's exposure they are killed. A 15 min. contact is sufficient to ensure the ultimate destruction of both nymphs and adults; an exposure of 4–16 hours kills them. For effective control of *Argas reflexus* generous dustings of the walls and floors of pigeon lofts should be carried out at regular intervals, and insufflation of the plumage (especially that of the neck) of each bird is also recommended.

BRENNAN, J. M. (1948.) **Field tests with tick repellents.**—*Publ. Hlth Rep., Wash.* **63.** 339–346. **989**

A number of organic materials were tested as repellents against nymphal and adult *Amblyomma americanum* by impregnating soldiers' clothing, using 1 or 2 oz. of the test substances, dissolved in acetone, per uniform. Subjects were exposed to heavy tick infestation for four-hour periods, ticks being removed and counted at intervals of one hour. The percentage of repellency was derived from the numbers of ticks on treated and untreated clothing. None of the substances tested proved to be irritant to human beings, and all gave some degree of protection. Butylacetanilide consistently gave good protection for at least ten days even at the 1 oz. dose. Benzyl cyclohexanol and phenyl cyclohexanol protected for five and three days respectively. Benzyl benzoate and dimethyl phthalate gave erratic results, but showed some promise. Dibutyl phthalate and 6–2–2 mixture were ineffective.—G. B. S. HEATH.

*See also absts.* **932** (*Triatoma* and *Ornithodoros*); **956** and **960** (mosquitoes); **977** (*Allodermanyssus sanguineus*); **1082** (fleas); **1121** (tsetse fly); **1125** (sheep scab).

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

MAQSOOD, M. (1946.) **Echinococcosis in bovines.**—*Indian J. vet. Sci.* **16.** 28–31. **990**

Of 62 cattle and 340 buffaloes examined at Lahore, hydatid cysts were present in 41 (66·1%) and 234 (68·8%) respectively. Their distribution in the body is given. The high incidence is related to the large number of stray dogs. Nine cases of cardiac echinococcosis were seen; five of these cases, in which death had been sudden, are described.—F. C. MINETT.

MOGHE, M. A. (1945.) **Results of a survey on the nature and incidence of helminth infection in cattle, goats and sheep in the Central Provinces and Berar and Central India.**—*Indian J. vet. Sci.* **15.** 222–230. **991**

The results are tabulated, showing the species of helminth, animal host, incidence and degree of infestation, and seasonal variation in incidence. Infestation in the area covered appears in general to be high.—F. C. MINETT.

IVERSEN, M. (1948.) Trikinosens utbredelse og bekjempelse i Norge. **[Spread and control of trichinosis in Norway.]**—*Norsk. Vet.-Tidsskr.* **60.** 303–309. [Abst. from English summary.] **992**

A survey of the extent of trichinosis in Norway.

Investigations during the last two years have indicated that about 2·5% of fur animals examined were infected. During the last three years no mink were found to be affected. The disease occurred in dogs, cats, wild foxes, badgers, rats and human beings. Official regulations concerning control of trichinosis are reviewed.

The author refers to diagnosis in man by serological tests.

HUMMELINCK, P. W. (1947.) Onderzoekingen over vorm en grootte van vrijlevende larven van paardenstrongyliden. **[Investigation of the shape and size of free-living larvae of equine strongyles.]**—*Tijdschr. Diergeneesk.* **72.** 411–424. [English & German summaries.] **993**

Larvae of the genus *Strongylus* can be differentiated to some extent by the time they have reached the second stage, but cannot be completely differentiated until they have reached the end of that stage. Details are given of the development of the oesophagus and intestine at the different stages of growth, and also of the development of the tail.—J. T. GREAVES.

HUNTER, G. W., & WORTH, C. B. (1945.) **Variations in response to filariform larvae of *Ancylostoma caninum* in the skin of man.**—*J. Parasit.* **31.** 366–372. **994**

Experiments were made on two volunteers to determine whether separate strains of *Ancylostoma caninum* vary in their abilities to invade the skin of man and whether the human subject varies in his ability to arrest the invasion of a parasite which may be considered uniform within its species.

A single culture of washed larvae secured from the faeces of laboratory housed dogs known to harbour a pure infection of *A. caninum* was used.

The volunteers were infected on the skin of the forearm each with 1,000 to 1,500 filariform larvae. The reactions which started with a prickling sensation during the time of application of the larvae were unexpectedly violent in character, so much so as to resemble a bacterial cellulitis.

One volunteer who had a past history of multiple allergies was treated in hospital for a month as a result of acute swelling of the entire forearm. A bacterial cellulitis was undoubtedly present in his case, but several burrows appeared and extended to seven or eight inches from the site of penetration and for some months he had episodes of local or distant swelling marked by burrow-like weals.

The other volunteer who had no past history of allergy had a two weeks' period of discomfort with swelling and pruritus, followed by several months during which transient weals appeared at or near the site of inoculation.

Both patients had eosinophilia lasting some months. Eggs of *A. caninum* were not found in the stools of either of the volunteers, nor were there any gastro-intestinal symptoms suggestive of the presence of adult worms.

The reaction of man to various species of *Ancylostoma* larvae is discussed. Species adapted to man penetrate the skin rapidly without much reaction. Larvae of species "foreign" to man vary in the depth to which they can penetrate. *A. braziliense* penetrates deepest and *A. caninum* is the least invasive.—M. C.

STEWART, D. F. (1948.) **A preliminary note on a complement fixation test to detect circulating antibodies in sheep infested with *Haemonchus contortus* and *Trichostrongylus* spp.**—*Aust. vet. J.* **24.** 112–113. **995**

*H. contortus* antigens were prepared from adult worms or third stage infective larvae. When adults are used considerable variation in potency of the antigen may occur. The activity of the antigen prepared from worms collected from sheep with a moderate infestation usually exceeds that prepared from worms from sheep severely anaemic or dying from haemonchosis. Such variations did not occur in antigens prepared from larvae and there is evidence that the stage of maturity of the worms may influence the occurrence of variations in antigenicity. Satisfactory antigens have been prepared from adult *Trichostrongylus* spp., including worms collected from sheep on the point of death from trichostrongylosis.

Infective larvae of *H. contortus* are now regularly used as a source of antigens. Larvae are washed from the walls of culture jars, cleaned of debris by sedimentation, weighed and ground in a glass bacterial mill. The ground larvae are divided into 1 g. lots each of which is suspended in 25 ml. glass distilled water. The resulting suspension is boiled by placing the container in a bath of 20% sodium chloride for ten min. After cooling the lots are pooled, made up to volume with glass distilled water or made isotonic with sodium chloride. Filtration through paper or cotton wool reduces potency, so the antigen is centrifuged lightly for 1 min. in an angle centrifuge.

The technique of the complement fixation test is described.

It has been found that there is complete cross absorption of antibodies between *H. contortus* and *Trichostrongylus* spp. Not all infected sheep develop positive reactions even after infections have existed for more than six months. Sheep which died of the infection did not develop positive reactions. In sheep given a massive dose of infective *H. contortus* larvae and which resisted the infestation there was a marked rise in circulating antibodies 2–3 weeks later, titres ranging up to 1 : 320. Parenteral injections of macerated adult worms resulted in the appearance of antibodies in the sera of lambs which had been raised worm free.—H. McL. GORDON.

SADUN, E. H. (1948.) **Resistance induced in chickens by infections with the nematode, *Ascaridia galli*.**—*Amer. J. Hyg.* **47.** 282–289. [Author's summary copied *verbatim*.] **996**

Evidence is presented to show that chickens develop a strong resistance to infections with the nematode *Ascaridia galli*, as results of either a previous single infection or of repeated infections. In each experiment most of the superinfected chickens discharged all the worms of the test infection. When a few worms were retained, their number was considerably lower than in the controls. The resistance acquired with the primary infection persisted and acted effectively on the worms of the secondary infection, even when over 2 months had elapsed between the two infections. Very heavy primary or secondary infections did not neutralize or reduce the acquired resistance of the chickens. In fact, a single previous infection conferred on the chickens a resistance which enabled them to survive an otherwise average lethal dose.

The secondary infection produced a reaction in the host which enabled it to eliminate some or all of the worms of the primary infection that had succeeded in remaining in the intestine of the chickens. This phenomenon was not demonstrable when sufficient time elapsed between the primary and secondary infection for most of the few remaining worms from the primary infection to reach maturity and considerable size. In chickens that had been repeatedly infected with large numbers of eggs, the worms of the test infection were completely eliminated before most of them came into close association with the host's tissue fluids.

PITTS, T. D. (1948.) **Experimental hatching of the eggs of** *Ascaris suum*.—*Proc. Soc. exp. Biol., N.Y.* **69.** 348–351. [Author's summary copied *verbatim*.] **997**

Infective *Ascaris* eggs treated in "Clorox"-sodium hydroxide solution, hatched and produced viable larvae when they were subsequently:

(a) incubated in physiological saline at 37·5° and 40°C. Hatching occurred up to 100% in 4 weeks.

(b) dried, rewet and incubated in saline at 37·5°C. Hatching occurred up to 100% in 2 days.

(c) centrifuged at speeds from 2000 to 3000 R.P.M. Hatching occurred up to 99·1% during 10 minutes of centrifugation at 3000 R.P.M. with a starting temperature of 40°C.

Batches of eggs from different worms showed different hatching characteristics depending on the treatment strength and time, and influenced by subsequent procedure.

SWALES, W. E., & GWATKIN, R. (1948.) **Experiments to determine the role of the thorny-headed worm,** *Macracanthorhynchus hirudinaceus*, **in the occurrence of disease of pigs in Canada.** —*Canad. J. comp. Med.* **12.** 297–299. **998**

The experiments conducted failed to show that either the thorny-headed worm of swine or its intermediate hosts, larvae of the "June beetles" *Phyllophaga anxia*, *P. rugosa* and *P. futilio* were reservoirs for swine fever virus. These larvae proved to be suitable intermediate hosts for *Macracanthorhynchus hirudinaceus*.

Two of six young pigs died as a result of infections with the worm.—P. J. G. PLUMMER.

COUGOULIS. (1947.) Phenothiazine in de behandeling van maag-darmstrongylose bij het schaap. **[Phenothiazine in the treatment of gastro-intestinal strongylosis in sheep.]**—*Vlaam. Diergeneesk. Tijdschr.* **16.** 138–144. **999**

An account of trials of phenothiazine on Persian and Afrikander sheep and on Saanen goats, in the Belgian Congo. Small single doses were first used and found to be ineffective. Larger doses were then tested; 25 or 30 g. proved to be fully effective against "strongyles".—J. E.

*See also absts.* **1122** (nodular worms in pigs); **1123** (onchocercosis in horses); **1124** (many helminth parasites).

## SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

MULLIGAN, R. M. (1948.) **Statistical and histologic study of one hundred and twenty canine neoplasms.** — *Arch. Path.* **45.** 216 – 228. [Author's summary copied *verbatim*.] **1000**

Of 98 dogs with 120 neoplasms, 80 were 6 years of age or older. Fifty were males and 48 were females. Eighty-three dogs had 1 tumor, 9 had 2, 5 had 3, and 1 had 4 tumors. The breed in 45 was terrier, in 15 shepherd, in 12 spaniel, in 3 collie, in 3 Pekingese and in 3 Chihuahua; the remaining 17 dogs were of miscellaneous breeds. The types of neoplasms among the 54 cancers were sarcoma in 24, carcinoma in 24, seminoma in 4 and cancerous melanoma in 2; among the 66 noncancerous tumors the types were adenoma in 28, papilloma in 12, mixed tumor in 9, melanoma in 7, lipoma in 3, fibroma in 2, neurofibroma in 2, myxoma in 2 and epidermal cyst in 1. The location of the 120 neoplasms was as follows: 46 were in skin; 24, in subcutaneous tissue; 23, in mammary glands; 11, in perianal glands; 6, in testes; 3, in lymph nodes; 7, in miscellaneous sites.

SCOTT, G. M. (1949.) **Resistance to tumour growth in rats fed on vitamin-B complex.**—*Lancet.* **256.** 102–104. [Author's summary copied *verbatim*.] **1001**

The addition of vitamin-B complex to rats'

normal diet of hospital scraps increased their resistance to the growth of Jensen's rat sarcoma.

In many cases the tumours in the rats on vitamin-B complex eventually disappeared, and the average volume about three weeks after inoculation was often less than a quarter of the volume of the tumours in controls.

A similar effect was obtained with a sarcoma of bone origin.

This resistance was also set up by three weeks' feeding on vitamin-B complex before the inoculation of tumour grafts.

Rats on the normal diet of hospital scraps with no additional vitamin-B have always appeared well-nourished and free from disease and have shown no obvious signs of deficiency of vitamin-B complex.

PAFF, G. H., BLOOM, F., & REILLY, C. (1947.) **The morphology and behavior of neoplastic mast cells cultivated in vitro.**—*J. exp. Med.* **86.** 117–123. [Authors' summary and conclusions copied *verbatim.*] **1002**

Fragments from two mast cell tumors of the dog have been cultured *in vitro.* Studies on the living and on fixed and stained preparations revealed the following:

Only mast cells grew out from the original tumor fragments though these contained other types of cells. They grew in some of the roller tube cultures in a sheet resembling an epithelium but in hanging drop cultures they lay separate and were irregularly spindle or star-shaped with long protoplasmic processes.

The cytoplasmic granules of the proliferating mast cells varied in size, number, and tinctorial properties. In most of the cells they stained metachromatically, in occasional cells some of the granules only could be stained, and in a few none could be stained.

SYVERTON, J. T., & BERRY, G. P. (1947.) **The superinfection of the rabbit papilloma (Shope) by extraneous viruses.**—*J. exp. Med.* **86.** 131–144. [Authors' summary copied *verbatim.*] **1003**

The potentialities that viruses have for the superinfection of virus tumors have not been recognized nor has the fact that a single cell can harbor more than one virus.

Rabbit papillomas, induced by the papilloma virus (Shope), were superinfected by B virus, myxoma virus, vaccinia virus, and probably, virus III. Similar attempts at superinfection by herpes virus were without success. The criteria for parasitization included the histopathological finding of specific inclusion bodies, the recovery of each virus by suitable animal passage, and the immunological identification of each virus.

Papillomas and probably the individual cells thereof were readily infected simultaneously by two viruses when the combination of B virus and myxoma virus was used. Cells of the Shope papilloma have a selective affinity for certain extraneous viruses introduced at a site distant from the tumor growths. It was found that exceptionally few cells in the basal layers of the epidermis escaped when myxoma virus was used as the superinfecting agent.

The cells of an epidermoid carcinoma which terminated the rabbit papilloma-to-carcinoma sequence were readily infected by B virus with resultant multiple intranuclear inclusion bodies in single cells.

Attempts to establish a prolonged superinfection of cells of the Shope papilloma by virus III were unsuccessful. This rabbit tumor differs therein from the Brown-Pearce tumor, an epithelioma of rabbits, in its susceptibility to infection with virus III.

SYVERTON, J. T., & BERRY, G. P. (1947.) **Multiple virus infection of single host cells.**—*J. exp. Med.* **86.** 145–152. [Authors' summary copied *verbatim.*] **1004**

Evidence is presented to show that two or more viruses can simultaneously manifest their characteristic activities within individual epithelial cells of the normal rabbit's cornea. This evidence, together with that previously presented [see preceding abst.], makes plain that multiple virus infection of a single host cell can take place in corneal cells, in the cells of chick embryos, and in those of rabbit tumors, both benign (Shope's papilloma) and malignant.

Certain implications of the findings are discussed.

SMITH, M. H. D. (1948.) **Propagation of rabbit fibroma virus in the embryonated egg.**—*Proc. Soc. exp. Biol., N.Y.* **69.** 136–140. **1005**

A successful method of cultivation of rabbit fibroma virus in the embryonated egg is described in detail, together with the effect of such cultivation on the chorioallantoic membranes, and the method of identification of the virus obtained after repeated egg passages. Shope's observation that inoculation with rabbit fibroma virus protects against myxoma is confirmed.—M. R. ORMEROD

LITTLE, P. A., OLESON, J. J., & SUBBAROW, Y. (1948.) **The effect of nutrition on the tumor response in Rous chicken sarcoma.**—*J. Lab. clin. Med.* **33.** 1139–1143. [Authors' summary copied *verbatim.*] **1006**

The effect of nutrition on the tumor response in Rous chicken sarcoma was determined by comparing observations of chicks fed synthetic diets with and without each nutrient. Tumor response was stimulated by the presence of folic acid, nicotinamide, calcium pantothenate, riboflavin, and cholic acid in the diet. Folic acid was the only

nutrient required to the extent that tumor response was prevented by its absence from the diet.

LITTLE, P. A., SAMPATH, A., & SUBBAROW, Y. (1948.) **The use of antagonists of pteroylglutamic acid in controlling Rous chicken sarcoma.**—*J. Lab. clin. Med.* **33.** 1144–1149. [Authors' summary copied *verbatim.*] **1007**

Two chemical antagonists of pteroylglutamic acid (4-amino-pteroylaspartic acid and 4-amino-pteroyl-d(-)glutamic acid) have been found capable of inhibiting tumor growth in baby chicks inoculated with Rous sarcoma virus when the chemicals were fed ad libitum at a concentration of 80 mg. per kilogram of diet. These chemicals and also 4-amino-N-methyl-pteroylglutamic acid were active in inhibiting tumor growth in baby chicks when injected. Toxic effects resembling the effect of severe vitamin deficiency occurred when the chemicals were injected, but not when the chemicals were fed.

*See also abst.* **1132** (identification of tumors—a textbook).

STEINBERG, B., & MARTIN, R. A. (1946.) **Leuko-agglutination differentiation of normal leukocytic and leukemic cell-types.**—*J. Immunol.* **52.** 71–75. **1008**

Using antileucocytic sera the authors demonstrated that, whilst there was some degree of cross agglutination at low titres, there was reason to believe that both mature and immature lymphocytes and granulocytes possessed specific antigenic properties.

The authors deduce from their findings that there is no chemical difference between the leucaemic and the normal lymphocyte.

—J. A. J. VENN.

## NUTRITIONAL AND METABOLIC DISORDERS

GUGGENHEIM, K., & BUECHLER, E. (1948.) **Nutrition and resistance to infection. The effect of quantitative and qualitative protein deficiency on the bactericidal properties and phagocytic activity of the peritoneal fluid of rats.**—*J. Immunol.* **58.** 133–139. **1009**

In experiments with rats reduction in their intake of protein resulted in diminished resistance to bacterial infection (*Salmonella typhi-murium*) as judged by the bactericidal activity of their peritoneal fluid. Phagocytes did not decrease in numbers or in activity until the protein-intake in the form of casein was reduced to one-sixth.

The qualitative aspect was studied by the use of equicaloric diets composed mainly of one of the following :– egg, meat, casein, soya bean, peanut and maize.

The bactericidal effect of the peritoneal fluid was dependent, in parallel with weight increase, on the quality of the protein in the diet. The proteins tested were specifically of diminishing value in the order given above.—J. KEPPIE.

WATSON, C. J., DAVIDSON, W. M., KENNEDY, J. W., ROBINSON, C. H., & MUIR, G. W. (1948.) **Digestibility studies with ruminants. XII. The comparative digestive powers of sheep and steers.**—*Sci. Agric.* **28.** 357–374. **1010**

The minimum number of animals used in any one trial was four, and the experiments were set up as randomized Latin squares. The rations used were dried roughages, succulent roughages, grain mixtures and unmixed grains. Steers digested maize silage better than sheep and also tended to digest hay fodder slightly better than sheep. The differences were not statistically significant. Sheep tended to digest grain a little better than steers but, with the exception of oats calculated from a mixed ration with hay, the differences were not statistically significant. With both oats and oat hulls sheep digested the ration better than steers. Results with timothy, alfalfa, barley, timothy and barley, and alfalfa and barley showed no difference between the digestive powers of the two species. It was concluded that while there were some slight differences in the digestive powers of sheep and steers, with most foodstuffs these were not of very great magnitude.—

—R. GWATKIN.

WAUGH, R. K., HAUGE, S. M., & KING, W. A. (1947.) **Choline studies with young dairy calves. II. Effect of milk and other supplements on blood choline levels.**—*J. Dairy Sci.* **30.** 641–648. **1011**

A fall in blood choline concentration was observed when milk was removed from the diet of young calves and replaced by grain containing approximately the same amount of choline. Addition of choline chloride to the milk-free diet and of choline chloride and methionine did not bring about an increase in the choline of the blood ; when milk was again introduced the blood choline rose again. Choline, when injected, was highly toxic and only a temporary rise in choline of the blood was achieved.—R. MARSHALL.

NOOT, G. W. V., REECE, R. P., & SKELLEY, W. C. (1948.) **Effects of thyroprotein and of thiouracil alone and in sequence in the ration of swine.**—*J. Anim. Sci.* **7.** 84–91. **1012**

Pure-bred Duroc Jersey and Berkshire weanling pigs were fed a basic diet of 75% yellow maize, 7% alfalfa leaf meal, 7% meat scraps, 9% soya bean meal and 2% minerals.

Various amounts of thyroprotein were added

either by direct feeding to the experimental animals or by admixture in the ration. 0·075 and 0·225 g. per 100 lb. bodyweight had no effect on weight gain, but 0·5–4·0 g. per 100 lb. bodyweight caused a decrease in average daily gain and an increase in food consumption.

It was found that thiouracil, when added to the ration before skeletal development was complete, had an adverse effect on development. When fed at the rate of 0·25% of the complete ration to pigs of about 125 lb. weight the difference between those pigs and the controls was as follows :– the average daily gain was 1·8 lb. and the feed consumed per 100 lb. of gain was 395·7 lb., while the average daily gain of the controls was 1·9 lb. and the feed consumed per 100 lb. of gain was 407 lb.

The authors regard the amount of thiouracil present in the pigs fed thereon as unlikely to "influence the consumer".—J. A. J. Venn.

Harvey, D. G. (1947.) **Trace elements in plant and animal nutrition.**—*Vet. J.* **103.** 278–289. **1013**

Plants have greater limits of tolerance than animals as regards a particular element in the soil upon which they grow and on this account and because of the diversity of their nature, there is more variety in mineral composition of plants than of animals.

Among some eleven trace elements whose importance in plant growth has been demonstrated, manganese, copper, boron and zinc are of particular interest, although diseases caused by a deficiency of the latter element have not been discovered in the United Kingdom. Interrelationship of elements, *e.g.*, of manganese and iron and of calcium and manganese may make diagnosis and treatment of a deficiency somewhat complex. Excessive application of an element to a soil deficient in that element may cause symptoms of toxicity in the plants.

In the case of animals, elements of particular interest are copper, iodine, cobalt and manganese, of which a deficiency in the diet causes disease, while molybdenum, selenium and fluorine in trace concentrations are toxic to animals.

—R. Marshall

Smith, E. L. (1948.) **Presence of cobalt in the anti-pernicious anaemia factor. [Correspondence.]**—*Nature, Lond.* **162.** 144–145. **1014**

The anti-pernicious anaemia factor which was isolated independently in Great Britain and in the U.S.A. has been found to contain cobalt to the extent of 4% of its dry weight.

S. comments that the presence of cobalt in an isolated compound of natural origin has not been previously reported and draws attention to the anaemia which occurs in cattle on cobalt-deficient pastures and which can be prevented and cured by administration of cobalt.—W. F. Syvret.

Bennetts, H. W., Beck, A. B., & Harley, R. (1948.) **The pathogenesis of "falling disease". Studies on copper deficiency in cattle.**—*Aust. vet. J.* **24.** 237–244. **1015**

A severe degree of copper deficiency is necessary to produce this fatal condition. No element other than copper has been incriminated in the pathogenesis. The essential lesion is a myocardial atrophy with replacement fibrosis and death is due to heart failure when an extra strain is placed on the heart by pregnancy, heavy lactation or seasonal anaemia.

Variations in the severity of the lesions in different cases suggest that the site of the lesions may be more important than their extent. Extensive fibrotic lesions occurred in some cases without any abnormality in the electro-cardiogram. It is possible that the fibrotic lesions are not as important as general weakness of the myocardium in causing the heart failure.—D. C. Blood.

Rubin, M., Bird, H. R., & Rothchild, I. (1946.) **A growth promoting factor for chicks in the feces of hens.**—*Poult. Sci.* **25.** 526–528. **1016**

The authors review the knowledge of new growth promoting factors in the faeces of cattle. Diets known to be free from such a factor were fed to hens and young chickens (3–6 weeks old). Their faeces were dried at 45°C. and fed at 5% level to day-old chicks in groups of six or 12. Other types of faeces were similarly used for comparison; they were :– (1) cattle faeces, (2) whole excreta of hens, (3) whole excreta of young chickens and (4) urine free excreta of hens obtained from high rectal fistulae. Groups fed normal diet served as controls. The chicks were weighed at six weeks of age when groups (1) and (4) had weight gains of 25% and group (2) 13% over controls, while in group (3) there was no weight gain over controls. The authors conclude that a chick growth factor probably identical with that of bovine origin is synthesized in the gut of hens but not in young chickens, and is less active in the presence of kidney excretion.—R. J. F.

Jürgens, R. (1948.) **Effect of vitamins and other substances on symptoms produced by dicoumarol poisoning.**—*Internat. Z. Vitaminforsch.* **19.** 342. [Abst. in *Brit. Abstr.* A III. Oct. p. 999 (1948), copied *verbatim.*] **1017**

Single and repeated doses of dicoumarol (2·5–500 mg. per kg. of body-weight) were given to rabbits, guinea pigs, rats, and mice, to determine the lethal and the min. active doses. The latter were 2·5, 125, 50 and 10 mg. per kg. of body-weight for rabbits, guinea-pigs, rats, and miee,

respectively. Dicoumarol produced local haemorrhages and capillary dilatation before any prolongation of prothrombin time occurred. After large doses, fatty changes in the liver also occurred; the antithrombin content, blood picture, and sedimentation rate were not affected. When small repeated doses (1–5 mg. per kg. of body-weight) were given twice a week, the prothrombin levels gradually returned to normal after the third week, in spite of continued dosing. The prolonged prothrombin time could generally be reduced by vitamin-K or fresh liver. After small doses of dicoumarol, 2·5 mg. of pantothenic acid or nicotinamide were also effective. Choline, inositol, citrin, heparin, thrombin, aneurin, or pyridoxine had no effect on hypoprothrombinaemia. Fatty degeneration of the liver was prevented only by choline or fresh liver.

RAY, S. N., WEIR, W. C., POPE, A. L., & PHILLIPS, P. H. (1947.) **Studies on the concentration of some B-vitamins in the blood of normal and cobalt deficient sheep.**—*J. Nutrit.* **34.** 595–599. **1018**

Sheep known to have been on a Co-low ration since birth were maintained on a basal ration of Co-deficient hay (0·03 p.p.m. Co) and a mixture of 80% maize and 20% maize gluten meal plus iodized salt *ad lib.* for 6–12 months. When Co deficiency symptoms were just evident, as indicated by a slowing of the growth rate, certain of the B vitamins were estimated in the blood and compared with similar estimations in blood from normal sheep maintained on the same ration except that they received a salt mixture containing 12·7 g. $CoSO_4.7H_2O$ per 25 lb. iodized salt.

Nicotinic acid and total pyridoxine values were lower in the Co-deficient sheep than in the controls, the mean nicotinic acid values for six deficient sheep being 9·53$\mu$ g. per ml. compared with 12·14$\mu$ g. for seven normal sheep, and mean pyridoxine values for five deficient sheep being 0·067 $\mu$ g. per ml. against 0·118$\mu$ g. for six normal animals.

There was no difference between the two groups with respect to riboflavin, folic acid and pantothenic acid concentrations, the respective values being 0·235, 0·044 and 0·432$\mu$ g. per ml. for the deficient sheep, with corresponding values for normal sheep of 0·265, 0·046 and 0·418$\mu$ g. per ml.—R. ALLCROFT.

JOHANSSON, K. R., SARLES, W. B., & SHAPIRO, S. K. (1948.) **The intestinal microflora of hens as influenced by various carbohydrates in a biotin-deficient ration.**—*J. Bact.* **56.** 619–634. [Authors' summary and conclusions copied *verbatim.*] **1019**

The type of dietary carbohydrate was found to influence the microflora of fecal droppings from laying pullets ingesting purified biotin-deficient ration. Dextrin was found to stimulate the development of considerable numbers of coliform bacteria. Lactose-containing diets likewise encouraged a fecal coliform flora, but lactic acid bacteria proliferated extensively in the intestines of hens fed such a diet. The most marked effect noted in case of the sucrose diet was a depressing action on fecal coliforms.

In general, intestinal microorganisms were found to increase in numbers from the duodenum to the cecum; yeasts and enterococci increased the least. Birds on the dextrin-containing diet appeared to have the greatest numbers of microorganisms at all levels of the intestinal tract as well as the least "spread" between the different counts. The cecum was found to be the site of the greatest concentration of intestinal microorganisms.

An analysis of variance was successfully applied to the data from fecal dropping samples. This revealed the presence of certain differences that were further detected by least significant difference calculations.

I. RASMUSSEN, A. F., Jr., WAISMAN, H. A., LICHSTEIN, H. C. (1944.) **Influence of riboflavin on susceptibility of mice to experimental poliomyelitis.**—*Proc. Soc. exp. Biol., N.Y.* **57.** 92–95. **1020**

II. WAISMAN, H. A., LICHSTEIN, H. C., ELVEHJEM, C. A., & CLARK, P. F. (1945.) **The effect of fat and sodium pyruvate on susceptibility of thiamine deficient mice to poliomyelitis virus.** —*Arch. Biochem.* **8.** 203–210. **1021**

I. Thiamine deficient mice are more resistant to infection with poliomyelitis virus than mice fed on a complete diet. In this study mice were fed on a diet complete in other respects but deficient in riboflavin. After 3–4 weeks they were still eating well, although after five weeks they began to lose weight; there was thinning of the fur, slight aural bleeding and about one-third had some body scabs. The viruses used were Lansing strain poliomyelitis and Theiler's encephalomyelitis strain GD VII, intracerebrally and Theiler's virus strain FA intraperitoneally. Inoculations were carried out when signs of riboflavin deficiency appeared, usually 14–24 days. Judging by the number of mice with paralysis no consistent difference was observed between various levels of riboflavin when mice were inoculated with Theiler's encephalomyelitis viruses. In four similar series inoculated with Lansing poliomyelitis virus the differences were slight, but the greater resistance in each series was in the riboflavin deficient group.

II. In thiamine deficient mice carbohydrate metabolism is abnormal and certain metabolites, particularly pyruvic acid, are accumulated. Tests were made to find whether these substances would interfere with virus invasion. Diets used consisted of sucrose, purified casein, salts, maize oil and crystalline vitamins. On low levels of added fat 20% of the sucrose was replaced isocalorically by maize oil and on high level of added fat, 80% of the sucrose was so replaced. Animals were injected intracerebrally with Lansing poliomyelitis virus or Theiler's encephalomyelitis virus GD VII after 9–15 days on the experimental diet, depending on the time taken for polyneuritic signs to appear in thiamine deficient control mice. Animals tolerated 2, 3 and 4% of sodium pyruvate in the diet, *i.e.*, 60–90 mg. per day. Pyruvate was added to the diets (high or low fat) when they had been made adequate in thiamine. Fat did not appear to have any thiamine sparing action in mice, as even when 80% of the sucrose in the diet was replaced isocalorically with maize oil, signs of nutritional disease appeared. The incidence of paralysis due to Theiler's encephalomyelitis virus was definitely higher on high fat diets, despite signs of polyneuritis. Possibly the delayed onset of polyneuritis allowed the virus to establish itself. The addition of pyruvate to the basal diet plus thiamine did not cause polyneuritis, the thiamine level may have been too high. The addition of pyruvate to high fat diets did not induce polyneuritis but the mice appeared to be more sensitive to the pyruvate, as more of them died early. In three of four series using diets with added pyruvate there was a decrease in the incidence of paralysis although there were no signs of deficiency. It is concluded that, although addition of pyruvate to diets decreased the paralytic incidence, the effect is not so striking as in cases of frank thiamine deficiency. Results with Lansing virus were more variable than with Theiler's virus, but the tendency was the same. The resistance of thiamine deficient mice to poliomyelitis can thus be partly explained by the accumulation of pyruvate or other metabolites from incomplete carbohydrate breakdown. There must be other factors, as the use of neither pyruvate nor high fat level produced the same difference in incidence of paralysis as is seen between deficient and optimally fed mice.

—Alan A. Wilson.

Haag, J. R., Westwig, P. H., & Freed, A. M. (1947.) **Antithiamine activity of bracken fern.** —*Fed. Proc.* **6.** p. 408. **1022**

Continuing their work on the antithiamine factor in bracken [*V. B.* **18.** 310] the authors examined further samples. The antithiamine agent is insoluble in ether, acetone and alcohol. In air-dried bracken it resists heating to 105°C., but boiling in water for 30 min. followed by subsequent drying destroys it.—M. C.

Haag, J. R., & Westwig, P. H. (1948.) **Further observations concerning antithiamine activity in plants.**—*Fed. Proc.* **7.** p. 157. **1023**

Further work [see previous abstract] showed that fresh bracken was more toxic for rats than air-dried bracken which itself was more toxic than a sun-dried sample. Fresh bracken after steaming for 30 min. was not toxic. The possible relationship of these findings to bracken poisoning of cattle is still obscure.—M. C.

Wathne, L. B. (1946.) Melkefeber hos sauen før og etter lammingen. [**Milk fever in ewes before and after lambing.**]—*Norsk VetTidsskr.* **58.** 332–338. **1024**

Milk fever occurs mostly in ewes with two or more foetuses. Symptoms are a rather dull appearance, anorexia, the animal hanging its head, and falling over if it tries to walk. Froth and stomach contents exude through nose and mouth. Sometimes the animals lie down and sprawl about as if with cramp. Temperature is generally normal, and pulse slow.

The disease is nearly always of short duration. Diagnosis is easy, prognosis is good. In 1930 treatment was by intravenous infusion of calcium chloride solution, but later magnesium chloride was added and gave less shock to the heart. Relapses were 40% but were reduced to 14% by the use of calcium borogluconate. Solution recommended is calcium gluconate 240 g., boric acid 48 g., spirit of thymol (10%) 10 drops in distilled water to make 1,000 ml; 25 to 40 ml. are injected into the jugular vein, and 50 to 75 ml. subcutaneously into the flank. The ewe is kept from pasture for two or three days, but the usual food should be given. The lambs should be kept from the dam for about eight hours. Complications after treatment are rare.—J. T. Greaves.

Horlick, L., & Katz, L. N. (1948.) **The effect of diethylstilbestrol on blood lipids and the development of atherosclerosis in chickens on a normal and low fat diet.**—*J. Lab. clin. Med.* **33.** 733–742. [Authors' summary copied *verbatim.*] **1025**

The implantation of stilboestrol pellets resulted in a marked hyperlipemia and hypercholesterolemia in chickens on a normal diet and on a specially prepared low fat diet.

The cholesterolemia observed in the stilboestrol implanted chickens on the normal diet was somewhat higher than that observed in the animals on the low fat diet.

The control animals on the low fat diet

showed levels of blood cholesterol slightly higher than those of the normal controls.

Atherosclerosis of the induced type was observed in a high proportion of the stilboestrol-treated chickens in both the normal diet and low fat diet groups.

Spontaneous atherosclerosis occurred in 40 per cent of the normal control animals and in none of the controls on the low fat diet.

A concept of the mechanism of stilboestrol action and of the control of the normal blood cholesterol is presented.

GRANADOS, H., GLAVIND, J., & DAM, H. (1948.) **Observations on experimental dental caries. The effect of purified rations with, and without dietary fat.**—*Acta path. microbiol. scand.* **25.** 453–459. [In English. Abst. from authors' summary.] **1026**

Two groups of young hamsters were reared for 105 days on purified diets, with and without lard. In agreement with the reports of other investigators working with rats, there was a lower incidence and extent of carious lesions in the hamsters receiving the fat-containing ration, though the differences were of low statistical significance. The animals in the group fed the lard-containing diet had a healthier appearance and a higher growth rate than those reared on the fat-free ration.

HORLÍCK, L., & HAVEL, L. (1948.) **The effect of feeding propylthiouracil and cholesterol on the blood cholesterol and arterial intima in the rat.**—*J. Lab. clin. Med.* **33.** 1029–1036. [Authors' summary copied *verbatim.*] **1027**

The feeding of diets containing either cholesterol alone in concentrations of 5 to 10 per cent, or propylthiouracil alone in concentrations of 0·5 to 0·6 per cent, or both combined, for periods up to thirty-eight weeks, failed to produce vascular lesions of the arteriosclerotic variety in rats.

The feeding of cholesterol or propylthiouracil alone produced a cholesterolemia of two to three times the normal values. Combining both gave average values approximately six times normal average values and as much as ten times normal for individual rats.

Cholesterol in excess of 5 per cent did not produce any further rise in the blood cholesterol levels; results of feeding 5 and 10 per cent cholesterol combined with propylthiouracil compared closely with one another.

Propylthiouracil did not succeed in breaking down the rat's resistance to cholesterol-induced atherosclerosis. The resistance to atherosclerosis in this animal is probably dependent on other factors in addition to the thyroid gland and its secretions.

HAMRE, C. J. (1947.) **Hematopoiesis in the bone marrow of rats recovering from nutritional anemia.**—*J. Lab. clin. Med.* **32.** 756–776. **1028**

Of 60 rats, weaned at three weeks old and fed a diet of cows' milk alone for a period ranging from 28–54 days until they were in a severe anaemic condition, 53 were given 0·5 mg. iron and 0·003 mg. copper per g. body weight, the remaining seven serving as untreated controls. Blood samples were taken from the controls and from the treated animals at the time they received the first dose and again at the time they were killed 10–48 hours later and the haemoglobin, erythrocyte, leucocyte and platelet values determined. The marrow of the femur, humerus and tail vertebrae was examined. Haemoglobin and erythrocytes increased in value from 26 hours, while normoblasts, eosinophiles and heterophiles increased from 12 hours after treatment. The first response of the bone marrow to treatment was the development of heteroplastic erythropoietic tissue and this was highest 18–26 hours after treatment; this period being the "critical period" of haematopoiesis of recovery, when a discharge of normoblasts, eosinophiles and heterophiles into the blood stream was observed. Erythropoiesis developed extravascularly in the intervascular stroma and no rupture of the membrane of the sinuses occurred. Pronormoblasts of the new erythropoietic tissue originated from stromal reticular cells and it was also concluded that haemocytoblasts were the progenitors of the granulocytes.

The text is illustrated by graphs and colour plates and there are numerous references.

—J. R. PICKFORD.

*See also absts.* **882** (diet and TB.); **1139** (nutritional deficiencies in livestock); page 252 (Books recently received).

## DISEASES, GENERAL

WIRTH, D. (1944.) Fröhner-Zwick Kompendium der Speziellen Pathologie und Therapie für Tierärzte. **[Manual of special pathology and therapy for veterinarians.]** pp. xvi + 825. Stuttgart: Ferdinand Enke. 8th Edit. DM 21 & DM 22.60. **1029**

This book is the eighth edition of the well-known compendium, the first edition of which, by Eugen Fröhner, appeared in 1912. The object of that edition was to give the essential information to veterinary students and to serve as a ready reference book for practitioners. The fourth,

fifth and sixth editions were produced by Professor Zwick and the seventh and eighth editions by Professor Wirth, of the Veterinary College at Vienna.

This edition is a revision of old material and it also contains new sections on about a dozen diseases not dealt with previously. The book is laid out in two sections, the first dealing with organic diseases classified according to body systems, and the second with infectious diseases classified on an animal host basis and covering horses, cattle, pigs, sheep, dogs, poultry, wild rabbits and honey bees.

The intentions of the original author have been followed in the successive editions and the text gives an admirable summary of essential information without going into discussions on debatable points and without giving references.

The quality of the paper is adequate without being luxurious and the printing is excellent and free from careless errors. As a reference book the old standard has been kept up and the book can be thoroughly recommended.—J. E.

VISHNEVSKIĬ, P. P. (1946.) **[Problems in the study of diseases of young stock.]**—*Veterinariya, Moscow.* No. 1. pp. 12–15. **1030**

The most frequently encountered diseases of young stock are: septicaemic diseases, intestinal diseases, and pulmonary diseases.

It is stated that prophylactic measures are not of great value in these diseases and the hope is expressed that suitable immunization methods for them may be found.—J. JONAS.

DUTHIE, R. C. (1948.) **An unusual autopsy finding in a pure bred Yorkshire sow, involving inbreeding, congenital malformation, chronic rhinitis and a neoplasm.**—*Canad. J. comp. Med.* **12.** 288–291. **1031**

The sow gave birth to eight dead piglets and was slaughtered shortly afterwards. P.M. examination revealed many changes in the head, such as destruction of the turbinated bones, a neoplasm on the right ramus, perforation of the bony palate, a misplaced molar, duplication of the paramastoid processes, bulla ossea and pterygoid processes of the sphenoid and palatine bones, distortion of the lower jaw, and other changes.—R. GWATKIN.

SCHERER, H. J. (1944.) Vergleichende Pathologie des Nervensystems der Säugetiere. **[Comparative neuro-pathology of mammals.]** pp. 336. Leipzig: Georg Thieme. £2. **1032**

This is an important book to animal pathologists. For some time before the War, the author worked in the Institut Bunge, Antwerp, under Dr. Ludo van Bogaert and he was well known in European and British neuropathological circles.

In the introduction succinct views are given on the value of studies in comparative neuropathology, views which can easily be extended to cover veterinary pathology as a whole. The pitfalls into which we, as pathologists, may fall are discussed, such as the inclination of animal pathologists to have too rigid a view of normality and to restrict examination of the brain of animals to those showing nervous symptoms during life. The value is emphasized of using modern neuropathological staining techniques and of restricting them to a few.

The first part of the monograph, to an extent of 192 pages, is concerned with an unrivalled analysis of primate ape material and all of this is illustrated in an admirable manner. As a beginning some attention is directed to normal anatomy and histology. Detailed descriptions are given of a condition called confluent leucoencephalosis—a demyelinating disease of monkeys often reported in European literature under a variety of names, *e.g.*, "Schilder's-like disease", all of which probably refers to the same condition. There is a wealth of information on other conditions such as amaurotic epilepsy (unknown in man), traumatic lesions and tuberculosis. It is known that there is a high incidence of tuberculosis in apes in captivity, but the author points out that the disease in the CNS takes the form of conglomerate tubercles in the brain substance and that the meningitis of childhood infection does not occur in these apes. Non-suppurative encephalitis is discussed and stress is laid on the absence of records of conditions in monkeys which might be comparable with the virus encephalitides of man and other animals. There is a list in summary form of the nervous diseases of man compared with those of apes.

The second section of the book attempts to deal with all other vertebrates in the same way, but the author has been limited by a lack of material from a wide enough variety of animal species. More attention is thus given to animals of zoological collections and the laboratory species and this is unfortunate. Through this section there is a constant comparison of diseases of animals with man. Under vascular lesions the relative notable unimportance of disease of the cerebral vascular system in animals is pointed out, as opposed to their catastrophic nature in man. The section on the virus diseases is largely review but is not without importance because of the breadth of knowledge brought to bear on the whole problem.

Canine encephalitis is given great consideration; the various lesions are described which have been commonly regarded as part of a "post-distemper encephalitic phase" and the common demyelinating encephalopathy of dogs is designated as "akute multiple Sklerose des Hundes".

The various types of intracerebral tumours are described; the incidence in animals would appear to be very much lower than in man. This inference may, however, be misleading because it is doubtful whether a sufficient number of animal brains, even those showing nervous symptoms during life, have been examined in detail by veterinary pathologists to justify such a generalization. This section is concluded by a valuable summarized check-list of diseases of the nervous system in animals.

The book was written during the war and no doubt this might have limited any more ambitious project the author had in mind. He is now deceased but the publication is a tribute to his ability; it should prove of great help to the veterinary pathologist and to medical workers with an interest in nervous diseases of animals.

—J. R. M. INNES.

ANON. (1945.) **Nervous diseases.**—*N. Amer. Vet.* **25.** 740–741. **1033**

A note on a report on neurology by Dr. C. SCHLOTTHAUER at a meeting of the American Animal Hospital Association. Certain nervous diseases of dogs were referred to, notably rabies and nervous forms of distemper.—R. MACGREGOR.

PRIOUZEAU. (1944.) Hémophile et purpura hémorragique. [**Haemophilia and purpura haemorrhagica.**]—[Abst. from abst. by CÉSARI in *Bull. Acad. vét. Fr.* **17.** 252–256.] **1034**

The memoir consists of five chapters. The first deals with the clinical history of the development of haemophilia and purpura in piglets born of a non-haemophilic mother. The second deals with purpura developing in cattle fatally poisoned by the ingestion of ammonium sulphate. The third chapter deals with purpura haemorrhagica of bovines, P. describing cases seen in the field. A classic and an atypical form are described. In the final two chapters, P. discusses his findings and makes the following points:–

Sulphate of ammonia when ingested by bovines causes characteristic symptoms of purpura. The disease appears in spring when the young plants in the pastures are rich in protein and mineral salts: the mineral balance is upset and causes, with other symptoms, an alteration in the coagulability of the blood, followed by the lesions of purpura. P. suggests that investigation is necessary to decide why it is that vessels rupture and allow the escape of blood. Snake venoms, including those of *Crotalus adamenteus* and *Bitis arietans* cause purpura-like lesions. Secondary purpura is seen in the toxic reaction to many chemical substances, including chloral, quinine, mercury cyanide, etc. In these cases, the haemorrhages are produced by a direct action of the poisonous substance on the endothelium of the vessels.—T. E. GIBSON.

PAGE, C. M. (1945.) **Survey of fracture treatment.**—*Brit. med. J.* Dec. 15th. 835–839. **1035**

A general review of the subject with a historical background.—A. H. HOGG.

FANKHAUSER, R. (1945.) Pathologisch-anatomische und histologische Veränderungen bei einer nicht-rachitischen Osteoarthritis deformans der Jungrinder. [**Anatomical and histopathological changes in a case of non-rachitic osteoarthritis deformans of calves.**]—*Schweiz. Arch. Tierheilk.* **87.** 403–417, & 455–465. **1036**

An extensive and detailed account is given of the pathological and histological findings on deformed bones of the forelegs of three young heifers and two male animals of the Simmenthal breed. Some animals were affected in only one and others in both forelegs and in one or more joints. The changes which were first seen at 6–24 months of age were slow, but eventually produced severe lameness. The animals were killed 6–21 months after the onset of symptoms.

The pathological examination indicated a diagnosis of osteoarthritis chronica deformans with no signs of rickets. The bone changes observed histologically confirmed the diagnosis. Deficiency in the diet appeared to be excluded and no cause for the osteoporosis could be ascertained.—A. M. COPPING.

I. PEARCE, L., & BROWN, W. H. (1948.) **Hereditary osteopetrosis of the rabbit. I. General features and course of disease; genetic aspects.**—*J. exp. Med.* **88.** 579–596. **1037**

II. PEARCE, L. (1948.) **Hereditary osteopetrosis of the rabbit. II. X-ray, hematologic, and chemical observations.**—*Ibid.* **88.** 597–620. [Authors' summaries copied *verbatim.*] **1038**

I. The manifestations and course of an hereditary disease of the rabbit are reported. The condition is present at birth and is invariably fatal, generally in the 4th and 5th weeks of age. Retardation and eventual cessation of growth with marked reduction in size are conspicuous characteristic symptoms.

The condition, which first occurred in the backcross progeny of a pure bred Dutch male rabbit, is inherited. It is determined by the expression of a simple recessive unit factor, affected individuals being homozygous for the factor. Rabbits heterozygous for the factor are identified only by appropriate breeding tests. The condition is not sex-linked.

The disease has a remarkable resemblance to osteopetrosis or marble bone disease of infants and children with respect to signs and general course and also, as may be stated in anticipation of later

discussions, to the characteristic abnormal condition of the skeleton.

II. The results of X-ray, hematologic, and chemical studies on cases of hereditary osteopetrosis of the rabbit are described and the resemblance of the findings to those of the severe juvenile form of human osteopetrosis is pointed out.

The outstanding feature of the X-ray examinations was the homogeneous dense appearance of the entire skeleton. This condition was present at birth. In older cases there was evidence of some differentiation of bone structure.

The hematologic studies showed that the disease was characterized by the development of a macrocytic anemia, thrombocytopenia, and a moderate myeloid leucocytosis. Other abnormal findings included high reticulocyte and normoblast counts, anisocytosis and poikilocytosis, and degenerative changes of the neutrophiles and lymphocytes.

The chemical studies showed very low serum calcium values; serum phosphorus values were low during the first 4 weeks of life but were somewhat higher than normal levels in older cases. The serum phosphatase values were elevated. The blood sugar content was generally low. The blood cholesterol values were generally high. The liver glycogen values were small especially in older cases and those for muscle glycogen were somewhat smaller than normal values.

HARBOUR, H. E. (1945.) **Abortion in cattle and sheep.**—*Trans. Highl. agric. Soc. Scot.* **57.** 16–40. **1039**

A general detailed description in general terms of the causes and treatment of abortion in cattle and sheep. The interplay between infective agents, immunity, and nutritional factors is discussed.—J. KEPPIE.

GORRIE, C. J. R. (1948.) **Balling gun injury in sheep.**—*Aust. vet. J.* **24.** 148–149. **1040**

Deaths have occurred following the introduction and inexpert use of an automatic balling gun for the administration of phenothiazine tablets. The balling gun and the method of use are described and two case histories are presented. There is a risk of producing lesions in the retropharyngeal region unless the instrument is used with care.

Injuries of this nature have been described by ROLLINSON (1948), and similar injuries incurred during the administration of copper sulphate-nicotine sulphate drench have been recorded previously (*V. B.* **7.** 639).—H. McL. GORDON.

SWANN, H. C. (1948.) **The investigation of disease in swine.**—*Vet. Rec.* **60.** 165–168. **1041**

S. gives details of the procedure for a veterinary practitioner to follow when dealing with an outbreak of disease in pigs. He gives a plan for a systematic examination of the circumstances that can be investigated on the farm, dealing with any movement of animals and human beings to and from the farm, the general hygiene, dietetics, the clinical characters of the illness and the lesions.

GENDREAU, L. A. (1948.) **Field observations on infectious swine rhinitis.**—*Canad. J. comp. Med.* **12.** 291–294. **1042**

Apart from lesions of the nasal cavity, abscesses in the throat region and lungs, pneumonia, adhesions of pleura, pericardium, liver and stomach were observed. The disease spread rapidly in the herds. The mortality rate can be as much as 20% of the herd, but survivors tend not to thrive and affected herds may cease to be profitable. Affected animals may not show signs of illness but be infective to other animals. There is no effective treatment. For these reasons slaughter of the entire herd is recommended, followed by routine cleansing and disinfection and a fresh start with healthy stock.—R. GWATKIN.

MALMÉJAC, J., CRUCK, S., & NEVERRE, G. (1947.) Sur l'hémolyse provoquée par la dépression barométrique. [**Haemolysis (in dogs) induced by barometric depression.**]—*C. R. Soc. Biol. Paris.* **141.** 392–394. **1043**

A preliminary report on the occurrence of an increase in $\beta$ globulin, determined electrophoretically, in dogs when subjected to a decrease in atmospheric pressure comparable to that at a height of 8,500 m. The dogs were held at this pressure for a period varying from three to nine hours and in one animal haemoglobinuria occurred. —J. A. J. VENN.

BLOOD, D. C., & WHITTEM, J. H. (1948.) **Congenital atalectasis of the lung in a cat.**—*Aust. vet. J.* **24.** 253–254. **1044**

A case of congenital atalectasis of the lung of a 6-month-old cat is reported. Clinical and pathological findings are presented and discussed. —J. H. WHITTEM.

WICKWARE, A. B. (1948.) **Infectious granuloma of fowls. A preliminary note.**—*Canad. J. comp. Med.* **12.** 294–296. **1045**

In the blood of a Light Sussex pullet there was an increase in granulocytes and monocytes and erythroblasts were present in moderate numbers. P.M. examination revealed great enlargement and necrotic areas of the liver; in the proventriculus there was a tumour-like mass the size of a turkey's egg and lesser growths at the juncture of the small intestine and caeca. A suspension of the growth was injected by the intramuscular route into chickens and produced atrophy and nodular lesions. Bacteriological studies and inocu-

lation results indicated that the condition was similar to the disease described by Hjarre and Wramby in Sweden. Four successful transmissions were made in cross-bred chickens with takes ranging from 50 to 90%. A *Bact. coli*-like organism isolated from the lesions, and from the apparently normal livers, produced breast lesions in several cases.—R. GWATKIN.

*See also* page 252 (Books recently received).

## POISONS AND POISONING

OCKERSE, T. (1946.) **Endemic fluorosis in South Africa.** pp. 114. Thesis, Johannesburg. Pretoria: Govt. Printer. **1046**

Fluorosis in man in South Africa is described. It is widespread and 805 endemic areas have been recorded. The occurrence of fluorine in rocks, minerals and water in South Africa has been surveyed and is described. The symptoms, lesions, treatment and prevention of the condition in man are described. It is stated that during this investigation chronic fluorine poisoning was also observed in cattle, which opens up a problem of economic importance in areas where water supplies for cattle are almost entirely derived from boreholes. Fluorine was found to be present in human milk but not in cows' milk; the reason for this is not known. Three photographs illustrate mottling and hypoplasia of the teeth in cattle.

There are numerous maps, illustrations and tables and a good bibliography.—M. C.

BOLTON, J. (1948.) **A case of phenothiazine poisoning in young bovines.**—*Vet. Rec.* **60.** 479. **1047**

Of 28 bullocks and heifers poisoning occurred in 20 following treatment with phenothiazine in recommended doses. The animals were all under two years old, and in poor condition. Symptoms varied from dullness, and weakness of the hindquarters, to coma and prostration, all cases having a subnormal temperature, and most of them constipation and rumenal tympany. Within 12 hours half of the animals were recovering, but after 24 hours two were dead and six seriously affected. Five of these subsequently died. P.M. examination revealed anaemic viscera, distended gall-bladders, amber coloured urine, and hard coated faeces in the rectum.—R. M. LOOSMORE.

*See also absts.* **1022** and **1023** (bracken poisoning).

ANDERSON, W. A., & RICHTER, C. P. (1946.) **Toxicity of alpha naphthyl thiourea for chickens and pigs.**—*Vet. Med.* **41.** 302–303. **1048**

Pullets, average weight one and a half lb., when given up to six ounces of meal containing 2% antu (alpha naphthyl thiourea), lost weight and became unthrifty. 2–3% mixtures of antu in mash was poisonous to baby chicks; they ate the mash readily. P.M. examination revealed distension of the pericardium with fluid and there were other minor changes in the liver and kidneys.

In pigs, doses as small as 37·5 mg. per kg. bodyweight were fatal. They ate a 2% mixture of antu readily. Extremely small amounts of antu were fatal to rats. P.M. examination of poisoned pigs revealed marked cyanosis of the skin of the throat and around the base of the ears; there was an extreme pulmonary oedema with an excess of fluid in the air spaces and interlobular connective tissue and death appeared to have been due to asphyxia. There was also some catarrhal gastritis indicating that the drug had acted as an irritant.

—J. D. BLAXLAND.

## PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

FREAR, D. E. H., SEIFERLE, E. J., & KING, H. L. (1946.) **A new classification system for chemical compounds.**—*Science.* **104.** 177–178. **1049**

The authors describe a classification system for chemical compounds based on the assignment of a "code number" to each compound. The code number consists of one or more group numbers. There is a pre-arranged list in which constituent chemical groupings are given numerical designations, the groups being listed in decreasing order of complexity. The presence of the elements O, N, S, or X (halogen) in the constituent group determines into which family the group falls and is the criterion of the complexity of the group.

An example of determining a code number is as follows:– N-chloro-o-nitrobenzenesulphonamide, $O_2NC_6H_4SO_2NHCl$. From the list given, chlorosulphonamides—$SO_2NHCl$ are designated 3, nitro compounds—$NO_2$ are designated 206 and $C_6$ ring systems are designated 951.

The code number is therefore 3—206—951.

The authors find that this system is well adapted for studies involving the correlation between chemical structure and physical, chemical, biological or other properties.—E. M. J.

SCHMIDT, L. H., HUGHES, H. B., & SMITH, C. C. (1947.) **On the pharmacology of $N_1$-parachlorophenyl-$N_5$-isopropylbiguanide (paludrine).**—*J. Pharmacol.* **90.** 233–253. **1050**

A study was made of the acute and chronic toxicities of paludrine in mice, rats, dogs and monkeys, and of the absorption, excretion and tissue distribution of the drug in these animals.

Acute toxicity varies widely for these different species, the mouse being more susceptible than the rat, the dog and monkey being the least susceptible. The route of administration also influences the condition. In regard to chronic toxicity the dog appears to be the most susceptible, the mouse and monkey are next in order and the rat is least susceptible. Paludrine exerts an effect on the gastro-intestinal tract which leads to loss of appetite and death by starvation. No evidence is available of toxic effects on other organs.

Absorption from the gastro-intestinal tract is slow but is 70–80% complete. The drug is localized in the tissues to a comparatively slight degree. With large doses, however, there is a greater concentration in the liver than in the other organs.

Paludrine rapidly disappears from the tissues when treatment with the drug ceases. Only a small fraction ingested is eliminated in the urine. The drug appears to undergo metabolic alteration.

—E. M. J.

GELLHORN, A., TUPIKOVA, N. A., & VAN DYKE, H. B. (1946.) **The tissue-distribution and excretion of four organic antimonials after single or repeated administration to normal hamsters.**—*J. Pharmacol.* **87.** 169–180. **1051**

With hamsters as experimental animals, the antimonial drugs used were injected intraperitoneally in doses of 10 mg. per kg. for tartar emetic, 5 mg. per kg. for anthiomaline (lithium antimony thiomalate), 500 mg. per kg. for stibanose (diethylamino ethanol salt of sodium antimony gluconate) and 100 mg. per kg. for neostibosan (diethylamine *p*-aminophenyl stibonate). Twenty-four hours after the injection of the drugs, analyses were made of the liver, spleen, intestinal contents and faeces, and of the urine to determine the antimony content. As the dose of the quinquevalent drugs greatly exceeded that of the tervalent compounds, a reduced dose of neostibosan was given to one group of animals, so that the amount of antimony would approximately equal that given when using tartar emetic. In testing the distribution of antimony after seven daily intraperitoneal injections only tartar emetic and stibanose were used, the doses being the same as for single injections.

Following a single injection, antimony was located to the greatest extent in the liver with all the drugs; a high concentration was attained in the spleen with stibanose and neostibosan, but not with tartar emetic or anthiomaline. The major part of the antimony was excreted in the intestinal contents in the cases of tartar emetic and anthiomaline, but by the kidneys with the quinquevalent compounds. Following seven daily injections there was an increase in the total amount of antimony in the liver in the case of stibanose, but the percentage of the total dose administered did not increase, and with tartar emetic it declined.

In spite of repeated doses of tartar emetic, only traces of antimony were found in the spleen, whilst with repeated doses of stibanose the spleen content became considerable.

Only very small amounts of antimony were found in other organs examined with any of the drugs.

In a series of experiments, daily injections of the drugs were made until toxic manifestations and death occurred, but the tissue distribution of the antimony at the time of death did not explain the difference in the toxicity of the tervalent and quinquevalent drugs, and no accumulation of antimony in other vital organs such as the heart, brain or lungs was found with any of the drugs.

—U. F. RICHARDSON.

GAUSE, G. F. (1946.) **Litmocidin, a new antibiotic substance produced by** *Proactinomyces cyaneus*.—*J. Bact.* **51.** 649–653. **1052**

G. describes an antibiotic, litmocidin, produced from an actinomycete, *Proactinomyces cyaneus antibioticus* present in soil in South Russia. Litmocidin appears to be a derivative of anthocyanidine and is a litmus-like pigment having for most strains of staphylococci, streptococci and *Vibrio cholerae* an action not only bacteriostatic but also bactericidal. This antibacterial action is not inhibited by the addition of 10–30% of human or horse serum to the nutritive medium.

—E. M. J.

BRAZHNIKOVA, M. G. (1946.) **The isolation, purification, and properties of litmocidin.**—*J. Bact.* **51.** 655–657. **1053**

B. isolated and purified the product litmocidin and found that the substance had a melting point of 144–156°C. It was soluble in water and at a dilution of 1 : 4,000,000 inhibited the growth of *Staph. aureus*.—E. M. J.

BEYER, K. H. (1948.) **Renal tubular excretion of penicillin as inhibited by caronamide.**—*Amer. J. vet. Res.* **9.** 157–163. **1054**

At ordinary therapeutic levels penicillin is completely removed from the plasma as it circulates through the kidneys: tubular excretion accounts for some 80% of this elimination. *p*-Aminohippurate (PAH) was capable of inhibiting tubular excretion of penicillin when administered in very large doses. Caronamide (4′carboxyphenylmethanesulfonanilide) was found to possess a similar property, and was also restricted essen-

tially to glomerular filtration ; it was well absorbed on oral administration, of low toxicity and could be readily dissolved in water as a mono or disodium salt. The effect of the drug was independent of the type of penicillin used. Although penicillin is not well absorbed from the gastro-intestinal tract high plasma penicillin levels were obtained when caronamide and penicillin were administered together by mouth.

Dogs submitted to the administration of caronamide remained healthy throughout the period of treatment and no gross or microscopic signs of kidney damage were revealed at subsequent P.M. examination. The value of caronamide-penicillin therapy was demonstrated in mice infected intraperitoneally with either Type 1 pneumococci or *Eberthella typhosa* by VERWEY & MILLER (1947). The dosage of penicillin necessary to cure experimental infection in the dog and mouse was 3·7–11 times as great when penicillin was injected alone as when it was administered with an oral dose of caronamide.—CLIVE BRIGGS.

GARROD, L. P. (1948.) **The bactericidal action of streptomycin.**—*Brit. med. J.* Feb. 28th. 382–386. **1055**

A series of experiments to test the efficiency of streptomycin under various conditions is described. The following results are reported :– the higher the concentration of streptomycin the more rapidly and effectively is the medium sterilized. Temperatures below 37°C. are less suitable for bactericidal action. *Staphylococcus aureus*, *Bacterium coli* and *Streptococcus pyogenes* are equally susceptible. A nutrient medium seems to be essential for the action of streptomycin. Bacterial suspensions in saline remained alive after the addition of streptomycin in high concentration (200 $\mu$g. per ml.). The greater the number of bacteria the greater the chance of some surviving even in high concentrations of streptomycin. The absolute concentration of streptomycin is not the determining factor : it is the relationship between that concentration and the number of bacteria. The streptomycin is not permanently inactivated by a high concentration of bacteria. When these are removed and replaced by others (within the numerical limit) the bactericidal activity is found to be undiminished.—J. DEANS RANKIN.

HENRY, J., HENRY, R. J., HOUSEWRIGHT, R. D., & BERKMAN, S. (1948.) **Studies on streptomycin. III. The effect of streptomycin on the metabolism of resting bacteria and on certain purified enzymes.**—*J. Bact.* **56.** 527–539. [Authors' summary copied *verbatim.*] **1056**

Streptomycin in very high concentrations does not inhibit catalase, carbonic anhydrase, cytochrome-cytochrome-oxidase, succinoxidase, carboxylase, urease, or trypsin.

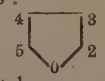
Streptomycin in concentrations just bacteriostatic noncompetitively inhibits the metabolism of certain carbohydrate intermediates in susceptible strains of *Staphylococcus aureus*, *Bacillus cereus*, and *Shigella sonnei*. Resistant strains of these organisms were little or not at all affected by high concentrations of streptomycin.

It is postulated that streptomycin either inhibits an enzyme or enzymes involved in carbohydrate metabolism or inhibits their formation. This inhibition, in both cases studied in this investigation, resulted in increased accumulation of acetate.

Whether or not the inhibition of metabolic functions observed bears a causal relationship to the bacteriostatic action of streptomycin cannot be concluded from this study, although all the observations made are at least compatible with such a theory.

ANON. (1947.) **Furans in dermatology.**—*Lancet.* **252.** 605. **1057**

Furans, a series of chemical substances whose basic structure is a five-membered heterocyclic ring numbered thus :–




are derived from oat bran, and derivatives having a nitro-group in the 5 position exert a bactericidal action on Gram-positive and Gram-negative bacteria. Furacin (5-nitro-2-furaldehyde semicarbazone), used as a supplement to penicillin in the treatment of wound infections was innocuous when applied locally and did not retard the healing of experimental wounds.

In treatment of wounds in human beings, the hazard of sensitization must be reduced before furacin dressings can be satisfactorily used.

—E. M. J.

GARDNER, A. D. (1948.) **Rapid disinfection of clean unwashed skin. Further experiments.**—*Lancet.* **255.** 760–763. [Author's summary copied *verbatim.*] **1058**

The power of 2% iodine in 70% ethyl alcohol to achieve virtual disinfection of flat areas of unwashed clean skin in ½ min. or less is confirmed, and it is shown that, if a full 30 sec. is allowed, the iodine may be reduced even to 0·5%.

The detergents, zephiran 30%, and cetrimide 10%, both in 70% ethyl alcohol, give satisfactory disinfection in 30–45 sec.

Ethyl ether, chloros, various mercury preparations, and some other substances have either a slower or an otherwise imperfect disinfecting power.

*See also absts.* **860** (penicillin in mastitis); **864** and **865** (antibiotics in mastitis); **873** (streptomycin); **883** (chemotherapy of TB.); **887** (P.A.S. for TB.); **905** (sulphonamides and fowl typhoid); **909** (aureomycin in brucellosis); **914** (foot rot); **921** (leptospirosis); **927** (trypanosomiasis); **934** (coccidiosis); **939** (piroplasmosis); **968** (feline pneumonitis); **981-983** (antihistamines); **999** (phenothiazine); **1028** (manual of therapy for veterinarians).

## PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

WINTERS, L. M., CUMMINGS, J. N., & STEWART, H. A. (1947.) **A study of factors affecting survival from birth to weaning and total weaning weight of the litter in swine.**—*J. Anim. Sci.* **6.** 288–296. **1059**

The size of litter and birth weight were the factors considered by the authors in studying the breeding records for the period 1937–44, of 745 litters from 14 inbred lines, 12 of which were Poland China, one Landrace-Tamworth cross and the other Poland China-Yorkshire cross.

The authors claim that in-breeding had no statistically significant effect on survival. An increase in size of litter had a slight adverse effect on survival and a significant effect on litter weights at weaning. Greater weight at birth increased the survival chances and weight at weaning.

The authors tabulate their findings and acknowledge that this work was done on a highly selected population of which only the most vigorous individuals were used for breeding.

—J. A. J. VENN.

HEDSTRÖM, H., & HOFLUND, S. (1944.) Om digestionen i vårmmen såʼskilt med tanke på skravelsjuka och aseptikemiscka sjukdomar hos kalv. [**Digestion in the rumen, in relation to "skravelsjuke" and asepticaemic diseases in calves.**]—*Skand. VetTidskr.* **34.** 513–533. [English & German summaries. Abst. from English summary.] **1060**

The composition of the food influences the microflora of the rumen. Deficiencies of certain constituents of the diet will lead to a marked reduction in the numbers of yeasts and bacteria which are essential for ruminal digestion.

Rumen samples from 20 cows with a wasting disease called "skravelsjuka" were examined and found to be deficient in yeasts and bacteria which occur in the normal healthy rumen.—M. C.

HOFLUND, S., & HEDSTRÖM, H. (1946.) Fortsatta undersökningar över vårmmens fysiologi. [**Continued research on the physiology of the rumen.**]—*Skand. VetTidskr.* **36.** 129–160. Abst. from English summary.] **1061**

This is a continuation of Hedström and Hoflund [(1944.) see preceding abst.].

Three sheep were placed on a diet free from sugar, easily soluble phosphates, or vitamins B and C. After 1½–2 months the sheep had lost weight, the rumen was free from fungi and the cocci had decreased in numbers. A flora of rumen fungi could only be introduced into one of the sheep after molasses and disodium phosphate had been added to the diet. Following an injection of glucose (1 g. per kg. bodyweight) in two of the sheep, one of which had been given fungi culture and one not, in the latter the pyruvic acid content rose to 1·40 mg.% after two hours, but there was no increase in the former. Two controls which had not been given the fungi culture died in coma alternating with cramp, four months after the commencement of the experiment.

In a second experiment the surviving experimental animal and a fourth sheep were placed on the diet used in the first experiment, but with the addition of sugar, disodium phosphate and fungi culture (5–7 mg. dry weight) twice each week for six months. They were healthy and gained weight despite the lack of vitamins B and C.

In further experiments on two sheep with the same diet the disodium phosphate was replaced by tricalcium phosphate. The result with regard to the rumen flora was the same as in the first experiment. After one month disodium phosphate was added to the diet, but the animals continued to lose weight; one month later one of the animals was given fungi culture. There was a rapid recovery and a gain in weight of ten and a half kg. in less than two months. The second sheep continued to lose weight until it was also given fungi culture, about one month later. Both animals were kept on the same diet with the additional fungi culture for a further nine months and were healthy; one had a lamb after being denied vitamins B and C for a year. The lamb grew normally.

In a fourth experiment the active rumen flora was impoverished by the omission from the diet of sugar, easily soluble phosphates and protein; in a month the animals were very weak with a depraved appetite so that they ate straw and cast wool polluted with urine. After the addition of casein, molasses and disodium phosphate to the diet the animals progressed slowly, whether they were given fungi culture or not. The fungi grew poorly in the rumen contents.

The experiment was continued until the rumen was practically free from fungi: as the fungi can utilize urea from straw polluted with urine, they must have existed longer in the rumen contents than other micro-organisms. The active rumen flora must therefore have been so completely eradicated that the implanting of fungi alone was not sufficient; this proves the intimate symbiosis between the different micro-organisms.

No symptoms of vitamin C deficiency were observed although one animal had existed 26 months and six animals 15 months on a diet containing practically no vitamin C.

The experiments demonstrate the significance of micro-organisms in the rumen. They must be taken into consideration when composing the diet, so that they find optimal conditions for growth.

By systematic examination of the rumen content the authors have sought to prove that various disturbances in the rumen flora can be diagnosed. The balance between the different micro-organisms should be restored to normal by changes in the diet and by the addition of cultures of fungi, bacteria, and ciliates: the solution of these problems should have great therapeutical and prophylactic significance, especially in deficiency diseases.—E. V. L.

CHU, C. M. (1948.) **Enzymic action of viruses and bacterial products on human red cells. [Correspondence.]**—*Nature, Lond.* **161.** 606–607. **1062**

Human red cells incubated with broth cultures of *Vibrio cholerae*, *V. proteus*, all types of pneumococcus, an enzyme from *Clostridium welchii* Type B, and viruses of the influenza group acquire three new properties: they become panagglutinable (agglutinable with every type of human blood serum); they are no longer agglutinated by viruses of the influenza group; and in the case of rhesus-positive cells they become agglutinable by the corresponding incomplete Rh antibody. Other organisms including strains of *Streptococcus* Group D, *Str. viridans*, *Staphylococcus albus*, *Staph. aureus*, and *Staph. citreus*, *Bacillus subtilis*, *B. mycoides*, *Erysipelothrix rhusiopathiae*, *E. monocytogenes* and *Salmonella choleraesuis* either produce panagglutinability alone, or also weaken haemagglutination by some viruses, but are without appreciable effect on red cells sensitized with incomplete anti-D antibody.

Since red cells treated with bacterial filtrates, Newcastle disease virus, or *Cl. welchii* enzyme inactivated at 56°C. for 30 min. gave negative results by all three reactions, it seemed probable that each preparation contained a single enzyme responsible for the production of all three reactions.—F. D. ASPLIN.

TOMPKINS, E. H. (1948.) **Factors in the use of mercuric bichloride for biologic studies. With especial reference to blood counts.**—*J. Lab. clin. Med.* **33.** 1094–1109. [Author's conclusions copied *verbatim.*] **1063**

The factors involved in the clumping of blood in red counts made by the aid of mechanical rotation are inherent in the interactions of Hayem's solution with plasma and cells and are merely emphasized by rotation. The capacity of rotors to demonstrate the phenomena of precipitation and aggregation and/or agglutination in blood counts was found useful in elucidation of the factors involved in these phenomena.

The clumping is due to the reactions of mercuric bichloride with the cells and the plasma as a tissue fixative. These reactions are regulated by (1) the concentrations of bichloride, (2) the relationship of the pH of the diluent to the isoelectric points of the erythrocytic contents and of the plasma proteins, and (3) the colloidal activities of intact erythrocytes.

When dilute enough, bichloride may cause lysis. When concentrated enough it causes colloidal aggregation and/or agglutination of the erythrocytes and precipitation of proteins, depending upon the pH. Addition of gelatin to the diluent protects the cells from lysis and aggregation at hydrogen-ion concentrations below pH 7·0, but does not affect the precipitation of proteins.

Aggregation of the erythrocytes and precipitation of the proteins under the action of bichloride occur independently of each other. Aggregation alone may simulate clumping. Precipitation of the plasma proteins alone does not cause clumping. When aggregation accompanies precipitation, characteristic clumping occurs.

The findings are discussed from the standpoint of their significance in relation to problems other than blood counts. They bear upon the phenomena of lysis, precipitation, and agglutination, upon diagnostic and therapeutic measures which involve colloidal or precipitative reactions, and upon the differential responses of tissues to fixation and staining.

I. KING, E. J., GILCHRIST, M., WOOTTON, I. D. P., DONALDSON, R., SISSON, R. B., MACFARLANE, R. G., JOPE, H. M., O'BRIEN, J. R. P., PETERSON, J. M., & STRANGEWAYS, D. H. (1947.) **Determination of haemoglobin. II. The Haldane haemoglobin standard compared with iron and gasometric estimations.**—*Lancet.* **253.** 789–792. **1064**

II. MACFARLANE, R. G., KING, E. J., WOOTTON, I. D. P., & GILCHRIST, M. (1948.) **Determination of haemoglobin. III. Reliability of clinical and other methods.**—*Ibid.* 254. 282–286. [For previous part, see *V. B.* **18.** 282.] **1065**

I. The haemoglobin values of 21 normal blood samples from human beings were determined by iron analyses and on the basis of oxygen capacity. They were also measured on the Haldane-Gowers scale. By the Haldane-Gowers method for estimating haemoglobin, 100% on the Haldane scale was equivalent to 13·8 g. of Hb per 100 ml. blood.

When based on iron determination 100% Haldane was equivalent to 14·8 g. Hb per 100 ml. blood and when based on oxygen capacity 100% Haldane was equivalent to 14·4 g. Hb per 100 ml. blood. The reasons for these discrepancies are discussed.

The adoption of the value given by iron determinations would bring the normal English

haematological values into close agreement with those accepted in the U.S.A.

II. Owing to lack of uniformity in instruments, standards and methods used for the estimation of haemoglobin, a study concerned mainly with instruments of the " clinical " type was made at the Radcliffe Infirmary, Oxford; and simultaneously at the Postgraduate Medical School, London, more accurate " laboratory " methods were investigated.

The " reliability " of various instruments and methods was determined, reliability being defined as " the closeness with which the results provided by the instruments under test are proportional to the haemoglobin content of the sample of blood investigated ".

Tables are given of results observed and the minimal difference in haemoglobin concentration which each instrument can detect. The bearing of these findings on the design of efficient instruments is discussed.—J. A. J. VENN.

ROSENTHAL, R. L., & TOBIAS, C. W. (1948.) **Measurement of the electric resistance of human blood; use in coagulation studies and cell volume determinations.**—*J. Lab. clin. Med.* **33.** 1110–1122. [Authors' summary copied *verbatim.*] **1066**

A reliable rapid method for measurement of electric resistance of small amounts of blood or similar material is presented.

A pattern of change in the resistance of blood during coagulation is described. These resistance changes make possible the determination of the clotting time with elimination of inconsistencies caused by motion and offer a quantitative means for the study of clot retraction. In view of the fact that no method has been available previously for a comparable quantitative study of clot retraction, electric resistance measurements may serve to detect significant variations of this process in disease beyond our present knowledge.

By means of the ratio of blood resistance to plasma resistance, the cell volume fraction of a sample of blood may be calculated. Cell volumes determined by resistance measurements were found to average 7·7 per cent lower than the hematocrit as determined by centrifugation.

HENDRY, E. B. (1948.) **The haemolysis of erythrocytes in sodium chloride solution and in sodium phosphate buffers.**—*Edinb. med. J.* **55.** 427–438. [Author's summary copied *verbatim.*] **1067**

The haemolysis of normal human erythrocytes in solutions of sodium chloride of varying concentration has been studied under defined conditions, and the various factors governing the degree of haemolysis in hypo-osmotic saline have been enumerated and discussed.

Haemolysis in iso-osmotic sodium phosphate buffer solutions has been investigated. When the osmotic pressure is kept constant, the degree of haemolysis depends upon the pH. There is a maximum degree of haemolysis corresponding to a pH of 6·75–6·85. This pH value may be associated with the isoelectric point of haemoglobin.

At the constant osmotic pressure, in buffered solutions, venous and oxygenated blood have the same degree of haemolysis. Buffered solutions do not prevent the increase in the degree of haemolysis which occurs when the temperature of the haemolysing solution is lowered.

BUDDLE, M. B. (1946.) **Inheritable cellular antigens in cattle blood.**—*Proc. 6th ann. Conf. N.Z. Soc. Anim. Prod., 1946.* pp. 54–56. Discussion pp. 57–58. [Mimeographed.] **1068**

The discovery of and recent American work on the 30 known inheritable antigens in the red cells of bovine blood are briefly reviewed. Work in New Zealand has comprised firstly the accumulation of stocks of reagents to identify the 30 unit blood factors, so that intensive field studies may be undertaken. One application of the work so far made has been the identification of identical twin calves by blood testing, and the elimination of doubt as to the paternity of calves whose dam had been served by two bulls at a particular oestrous period.

The possibility that particular patterns of blood factors may be found to be associated with important commercial productive qualities in cattle is mentioned. Should this possibility prove to be true, it is pointed out that by the testing of calves at an early age, it would be possible to determine in advance their future potential productive qualities.—J. B. SWAN.

WUNDERLY, C., & WUHRMANN, F. (1947.) **The effect of experimental increases in the $\gamma$-globulin and albumin content of sera on the response given by turbidity and flocculation tests.**—*Brit. J. exp. Path.* **28.** 286–294. **1069**

A comparison was made of the effect on the Takata reaction, the thymol turbidity test, the cephalin-cholesterol-flocculation test, and the cadmium turbidity test, of adding normal $\gamma$-globulin and albumin to normal human serum or to human hepatitis serum (containing a high concentration of lipoid-carrying globulin). The three last-named tests responded almost equally well to an increase of $\gamma$-globulin in normal serum; with variable albumin, the cadmium test gave a negative result at a lower albumin concentration than the cephalin or thymol tests. With increasing amounts of albumin added to hepatitis serum, the Takata test was particularly affected, and it was concluded that this test only gave a strong positive

response when the serum protein contained both increased globulin and decreased albumin. The cephalin and thymol tests still gave a positive reaction at a dilution of hepatitis serum with which the cadmium test was negative.

These findings are discussed.—E. COTCHIN.

DRINKER, C. K., & HARDENBERGH, E. (1947.) **Absorption from the pulmonary alveoli.**—*J. exp. Med.* **86.** 7–18. [Authors' summary copied *verbatim.*] **1070**

Experiments upon dogs anesthetized with nembutal and lasting 4 hours, in which the right lymphatic duct and thoracic duct have been cannulated and collection of lung lymph and blood specimens was accomplished after intratracheal instillation of dog plasma, purified bovine serum albumin, crystallized egg albumin, and hemoglobin, have shown that the absorption of such molecules is slight. Experiments in which pyrex glass spheres averaging 4 micra in diameter were instilled failed to disclose entrance of these distinctive foreign particles into the lymph stream, though the fact that lung phagocytes were often found containing the particles or covered with them, indicated that eventually these particles would be found in lung lymphatics and in lymph nodes. The protection against absorption from the lung alveoli is in the main due to intact alveolar epithelium through which molecules of the dimensions of the proteins commonly entering the alveoli, as a result of trauma or disease, pass very slowly and are found in small traces in lung lymph and even to a less degree in blood.

LALICH, J. J. (1947.) **The influence of injections of homologous hemoglobin on the kidneys of normal and dehydrated animals.**—*J. exp. Med.* **86.** 153–158. [Author's summary copied *verbatim.*] **1071**

Dehydration, if sufficiently prolonged, favors the accumulation of hemoglobin or its derivatives in the kidneys of rabbits, principally casts formed in the distal convoluted tubules.

Once pigment casts have been produced in the distal convoluted tubules, there is obstruction, with atrophy and dilatation of the tubules proximal to the obstruction. When the involvement is sufficiently extensive, there is elevation of the non-protein nitrogen and some animals die because of renal failure.

GABEL, W. (1940.) **Lead porphyrinuria.**—*Arch. exp. Path. u Pharmak.* **195.** pp. 365–382. [Abst. from abst. in *Brit. Abstr.* A.III. September. p. 919. (1948.)] **1072**

The amounts of porphyrin per 100 ml. in urine were as follows:—in normal horses 6·3 $\mu$g. in cattle 2–4 $\mu$g., and in rabbits 2·4–3·7 $\mu$g. No correlation was found between the Pb content of food and porphyrin excretion.

SARKAR, B. C. R., LUECKE, R. W., & DUNCAN, C. W. (1947.) **The amino acid composition of bovine semen.**—*J. biol. Chem.* **171.** 463–465. [Authors' summary copied *verbatim.*] **1073**

The concentration of eleven amino acids in bovine sperm and seminal plasma is reported.

With the exception of arginine, leucine, and tryptophan, the amino acid composition of sperm and seminal plasma is quite similar. The arginine content of sperm is very high but is relatively much lower in seminal plasma. The tryptophan concentration in seminal plasma is considerably higher than that found in sperm.

DERIVAUX, J. (1944.) Variations pondérales des parathyroïdes chez le chien normal. [**Parathyroid weight variations in the normal dog.**]—*C.R. Soc. Biol. Paris.* **138.** 879–880. **1074**

Weight values of the thyroid and parathyroid glands were assayed in 13 normal dogs. The glands together with surrounding tissues were fixed in 10% formalin for 4–5 days and then dissected free and weighed. Subsequent histological examination verified the nature of the tissues. Mean weights are given as follows: all four parathyroids—1·8 mg. per kg. bodyweight [PIERRE, DE BOISSIZEN ET LOMBARD (1939) recorded 1·22 mg. per kg. bodyweight for the external parathyroid glands], both thyroid glands 227·9 mg. per kg. bodyweight. The weight of the superior parathyroid averaged four times the weight of the inferior parathyroid gland.—C. W. OTTAWAY.

DEY, B. B., KRISHNAN, P. S., & GIRIRAJ, M. (1944.) **Studies on the preservation of glands. III. The preservation of thyroid glands.**—*Current Sci.* **13.** 9. **1075**

Using iodine partition as the index of change, in investigations carried out on the preservation of desiccated thyroid glands, stored under a variety of conditions, the authors found that unlike those of adrenal and pituitary, the active principles of this gland possess a remarkable stability.—S. S. NEGI.

*See also absts.* **1129** (secretion of milk—a textbook); **1131** (general endocrinology—a textbook); **1135** (a history of the heart and circulation); **1138** (handbook of microscopic characteristics of tissues and organs); page 252 (Books recently received).

## PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

SMYTHE, V. R., & TABRETT, D. (1946.) **A method for detecting sources of milk contamination on farms.**—*Qd J. agric. Sci.* **3.** 103–109. **1076**

The basis of the method is to rinse utensils, etc., suspected of causing contamination, with a suitable quantity of fresh milk withdrawn under aseptic conditions, the rinsings being subjected

to a suitable test (*e.g.*, methylene blue reduction) using another sample of aseptically drawn milk as control.

The method has been found practicable under field conditions. Results of tests carried out on five farms are appended.—J. H. WHITTEM.

SCHARP, L. R. (1947.) **Observation on the quality of a factory milk supply, with special reference to the incidence of mastitis in graded milk.**—*Aust. J. Dairy Technol.* **2.** 48–49. **1077**

S. outlines the methods adopted in the grading of milk in Victoria.

At the Maffra Co-operative Milk Products Factory, in 1945, 0·239% of milk was de-graded, while in 1946 0·12% was de-graded.

For the 21 months up to March, 1947, investigations showed that microscopical evidence of mastitis was present in 38·7% of samples of rejected or de-graded milk.

It is suggested that mastitis affects the grade or quality of milk.—J. H. WHITTEM.

HÖKL, J., PROKŮPEK, K., & HOS, F. (1946.) Konservace padlin a konfiskátů z jatek formaldehydem. **[Preservation of condemned carcasses before disposal by means of formalin.]**—*Čas. československ. Vet.* **1.** 89–92. **1078**

The authors studied the value of formalin for the preservation of condemned carcasses and infected organs. Carcasses of horses, cattle and pigs were soaked in 0·3–3% aqueous solution of formaldehyde, the concentration being controlled during a period of 38 days. The sterilization of the surface by formalin was complete. Meat meal and bone meal prepared from such carcasses were without any trace of formaldehyde.

The conclusion is drawn that formalin is a cheap and efficient preservative for condemned carcasses and the danger of the spread of infections by transport of infected carcasses is reduced to a minimum.—E. PŘIBYL.

KRÁL, J. (1946.) Experimentální studie o určování jakosti masa objektivní methodou. **[Determination of quality of meat by estimation of the water content of the bone marrow.]**—*Čas. československ. Vet.* **1.** 92–94. **1079**

The water content of the bone marrow depends upon the plane of nutrition and state of health of the slaughtered animal and is not influenced by sex. K. examined the water content of the bone marrow using metacarpal bones of 145 slaughtered cattle and found that in group A, first quality, the average was 3·40% in group B, second quality, 6·33% in group C, third quality, 18·67% and in group D, very poor quality, 61·28%.

K. considers that the water content of the bone marrow in slaughtered animals may be used to classify the meat according to quality. He recommends its determination, especially in the slaughter of undernourished and sick animals in order to evaluate the meat.—E. PŘIBYL.

BLANCHARD, L., NÉVOT, A., & PANTALÉON, J. (1946.) Application des techniques de laboratoire à l'inspection sanitaire des denrées alimentaires. Azote basique volatil total et inspection des viandes. **[A chemical technique for estimation of putrefactive change in meat.]**—*Encyclopéd. vét. périod.* **3.** 417–435. **1080**

The proteolytic bacterial count in meat can be estimated by adding lithium carbonate to an aqueous suspension at 60°C. The ammonia evolved is passed into 0·02N or 0·1N acid. 40–45 mg. of ammonia in 100 g. sample is normal, 90–100 mg. of ammonia justifies seizure.—R. MACGREGOR.

JOHNS, C. K. (1948.) **The reducing sugar content of frozen egg as an index of the bacterial content.**—*Canad. J. Res.* Sec. F. **26.** 18–23. **1081**

Studies to determine the degree of correlation between bacterial content and reducing sugar content in commercial frozen eggs were conducted on samples taken from numerous factories in different parts of Canada. Total viable counts, direct microscopic counts and coliform counts were carried out as well as duplicate analyses by two different workers for reducing sugar content. Tests for reducing sugar were of no practical value. Furthermore, the reducing sugar readings showed no correlation with viable or direct microscopic counts for bacteria. Few of the bacteria isolated in this study were able to ferment glucose.

—J. L. BYRNE.

NICHOLSON, H. P., & GAINES, T. B. (1948.) **A comparison of the effectiveness of 5 and 10 percent DDT dusts for the control of rat fleas.**—*Publ. Hlth Rep., Wash.* **63.** 129–136. [Authors' summary slightly amended.] **1082**

DAVIS (1945) found that D.D.T. was effective in controlling rat fleas.

Comparative data are presented concerning the effectiveness of single applications of 5 and 10 percent DDT dust applied under field conditions to control rat fleas in business establishments. No significant differences could be detected over a period of 3 months. *Xenopsylla cheopis* (Roth.), the oriental rat flea, was the predominant species present. Other species of rat fleas were scarce both in treated and check establishments especially during the later phases of the investigations. For this reason comparisons are based primarily upon the oriental rat flea.

BOURDILLON, R. B., LIDWELL, O. M., LOVELOCK, J. E., CAWSTON, W. C., COLEBROOK, L., ELLIS, F. P., VAN DEN ENDE, M., GLOVER, R. E., MACFARLAN, A. M., MILES, A. A., RAYMOND,

W. F., SCHUSTER, E., & THOMAS, J. C. (1948.) **Studies in air hygiene.**—*Med. Res. Coun., Lond. Spec. Rep. Ser.* No. 262. pp. 356. **1083**

This report is a symposium by a number of members of a team which worked during the war on certain aspects of air hygiene and airborne infections. Many of the contributions deal with medical aspects of these problems, but the veterinary reader will find much of interest and value. The techniques developed for sampling air for bacteria are dealt with in 12 papers by Bourdillon, Lidwell, Schuster, Thomas, Miles and Raymond. The various types of apparatus which were used are described and illustrated. The disinfection of air is dealt with under five heads, namely by chemicals, by ultraviolet radiation, by heat, by steam and by recirculation through filters; there are 22 papers in these sections. Other sections deal with field trials, air hygiene in warships and animal tests with infective aerosols.

The papers covering infective aerosols are contributed by Bourdillon and Glover. A bakelite apparatus for the study of bacterial aerosols suitable for use with ferrets and rabbits was developed and is described. It permits of samples being withdrawn as required and is designed to protect the operator against accidental contamination.

The method for estimating the number of tubercle bacilli in the air of the exposure chamber by direct count of stained organisms on a slide is described.

In experiments on the infection of ferrets with large and small airborne particles, influenza and infection due to a combination of influenza and a Group C streptococcus were studied. For these studies it was necessary to determine the respiratory volume of the ferret and the method by which this was done is described; the average intake of air by a ferret was estimated to be 500 ml. per min.

Bourdillon summarizing the work states that while it is fairly easy to produce sterile air in a small cabinet it is quite impracticable to do so in a street or a factory. It is, however, generally easy to produce a marked improvement without excessive expense. That reduction of the amount of infective material in the air is worth while is indicated by animal experiments which demonstrate that the severity of the disease and mortality in animals exposed to infected aerosols depend directly on the dose inhaled. In epidemics of influenza it is well known that many people contract a mild sub-clinical infection and this is almost certainly due to their receiving a small dose of the virus. Daylight and sunlight even after passing through window glass are useful bactericides and so the provision of large windows does lower the content of air and dustborne bacteria. Natural ventilation is an admirable means of air disinfection. Ultraviolet radiation has great potential value, but is relatively ineffective against dustborne organisms. Chemical methods are apt to be unsatisfactory from lack of adequate attention.—M. C.

*See also absts.* **980** (transmission of Q fever by milk).

WATROUS, R. M. (1947.) **Health hazards of the pharmaceutical industry.**—*Brit. J. industr. Med.* **4.** 111–125. [Taken from abst. in *Bull. Hyg., Lond.* **22.** 775–776. (1947). Signed: R. E. LANE.] **1084**

The hazards of organic synthesis are dealt with. These may arise from the substances used to attack organic compounds, *e.g.*, agents used for chlorinating, sulphonating, methylating or acetylating; from intermediate compounds, or from the final product. Mepacrine, nicotinic acid, powdered penicillin, local anaesthetics, neoarsphenamine and other preparations are mentioned for their effects upon the skin. The synthesis of stilboestrol carries its own peculiar hazard of gynaecomastia and a "feminizing" action, the effect of which may be psychologically as well as physically harmful.

Miscellaneous hazards in the industry are also commented upon, including those from exposure to bacteria and viruses—workers handling equine encephalomyelitis virus may be immunized with 0·5 c.c. each of Eastern and Western type vaccine repeated in a week, with a "booster" dose each year.

The need is stressed of instructing laboratory research workers in the dangers to health which arises from handling certain common chemicals.

## LIVESTOCK HYGIENE

POINDEXTER, H. A. (1949.) **Experimental animal colony in tropical West Africa.**—*Publ. Hlth Rep., Wash.* **64.** 57–62. [Author's summary and conclusions copied *verbatim.*] **1085**

We have recorded some of the factors involved in maintaining a healthy animal colony in tropical West Africa, the most important of which appear to be: 1. Precautions necessary to avoid infection and infestation. 2. Provision for adequate satisfactory food at a reasonable price. 3. An average night temperature below 75°F. for at least part of the year.

Staple diets have been worked out with average feeding costs for rabbits of 13 cents per

day; guinea pigs, 4½ cents per day; white rats, two-thirds cent per day; and white mice, one-sixth cent per day.

These facts may be of value to those planning laboratory researches in this section. Our observations suggest that American bred white rabbits and guinea pigs will not breed well in the moist hot climates of the coast of Liberia, especially in the Monrovia area, and that a higher altitude and/or a lower night temperature may be essential to rapid reproduction of these two types of animals.

ROSE, A. L. (1948.) **Problems confronting animal industry in Northern Australia.**—*Aust. vet. J.* **24.** 204–220. **1085**

The value of the pastoral industry amounts to 87% of the total production of the Northern Territory but, although cattle exports have doubled, there has been no considerable increase in cattle numbers during the last 23 years and the sheep industry is not thriving.

The major factors retarding the development of the pastoral industry have been an unsympathetic administration and lack of staff and facilities. During and since the war these inhibitions have been removed and a most adequate programme for the development of the livestock industry in this area has been set in motion.

The husbandry practice in the area depends on the isolation of water supplies to retain cattle in a given area. This system breaks down in wet weather and makes disease control, economic use of land and regular calf production impracticable.

Pleuro-pneumonia, cattle tick and piroplasmoses, buffalo fly, botulism, osteomalacia, malnutrition, Kimberley horse disease, Birdsville disease and poison plants are the most important disease problems in the area. Improvement in fencing, water supplies, labour, stock routes, dips and sprays is badly needed before adequate disease control measures can be undertaken. Generous financial assistance is at present available for improvement of these public utilities.

The huge economic losses which occur as a result of the long road and rail journeys necessary to get cattle to abattoirs can only be prevented by the establishment of meat works in cattle areas. Labour difficulties can only be overcome by improving salaries, living conditions and amenities to attract young men and women to the area.

—D. C. BLOOD.

PHILLIPS, R. W. (1944.) **[Livestock improvements in China.]**—*Chin. J. Anim. Indust.* **2.** 1–100. **1087**

A general survey of cattle, sheep, goats, pigs and poultry in China, the types of animals bred, systems of management, feeding, and marketing. Information is given on the use of imported foreign breeding stock.—S. J. CHU.

## REPRODUCTION AND REPRODUCTIVE DISORDERS

MERCIER, E., & SALISBURY, G. W. (1946.) **The effects of season on the spermatogenic activity and fertility of dairy bulls used in artificial insemination.** — *Cornell Vet.* **36.** 301 – 311. [Authors' summary and conclusions copied *verbatim.*] **1088**

Five Holstein-Friesian and five Guernsey bulls were used routinely for one year in artificial insemination. Eight different semen characteristics were studied for most ejaculates. The variation among the bulls in these semen characteristics was marked. Also, important month-to-month differences were noted for most semen characteristics.

A total of 328 ejaculates were used for 20,689 inseminations, of which 58·2 per cent were apparently successful. The bulls varied in fertility and highly-significant month-to-month variations in fertility were observed. When the data for the ejaculates of the two breeds were combined, the semen characteristics correlated with fertility were concentration of spermatozoa, percentage of abnormal spermatozoa, and methylene blue reduction time. The correlation coefficients, though mathematically significant, were small.

In spite of a highly significant breed difference in the proportion of morphologically abnormal spermatozoa, the variations in semen quality noted between the Holstein and Guernsey bulls are believed to be insufficient to explain all the difference in fertility between these breeds.

ROTTENSTEN, K. (1948.) Iagttagelser og Undersøgelser over nedsat Frugtbarhed hos Kvaeg. **[A sterility-producing agent transmitted in the semen of bulls used for artificial insemination.]** pp. 89. Copenhagen: Ejvind Christensens. [English summary.] **1089**

Low fertility occurred in the cows (10,000 in number) served by bulls belonging to an artificial insemination centre between Jan. 1946 and Feb. 1947. There was marked variation in the conception rates of individual bulls, these variations could not be correlated with concentration, motility or methylene blue reduction rates of the semen. Cows returning to the first service were difficult to get in calf by subsequent services, but their infertility tended to disappear spontaneously after a time.

It is considered that the evidence suggested

that an agent was transmitted with the semen which caused temporary sterility in the cows.

On clinical examination of the genital organs of the bulls no abnormalities were found, nor did the spermatozoa have any abnormality.

From January 1947 the diluent used for the semen was changed to a diluent containing 0·3% of sulphanilamide and from this date a marked improvement in the conception rate occurred.

This improvement may or may not have been due to the new diluent, as one of the bulls which had low fertility was discarded and greater use was made of the more fertile bulls.

There is no information in the summary regarding the probable nature of the hypothetical infective agent, nor is there any mention of bacteriological examination of the semen, but it is stated that the bactericidal action of sulphanilamide may have counteracted the sterility-producing agent.—M. C.

ROTTENSTEN, K. (1948.) **May the bull be responsible for the transmission of non-specific infectious sterility?**—*Vet. Rec.* **60.** 327–328. **1090**

This is a condensed account in English of the work described in the previous abstract.

The fact that a drop in conception rate occurred with the fertile bulls when they were used for second service of cows which had failed to hold to service by bulls of low fertility is held to support the theory that these cows had been infected with a sterility-producing factor contained in the semen of the bulls of low fertility. —M. C.

HENNAUX, L., DIMITROPOULOS, E., & CORDIEZ, E. (1948.) L'action de la pénicilline sur la vitalité du sperme de taureau. **[The action of penicillin on the spermatozoa of the bull.]**—*C.R. Soc. Biol., Paris.* **142.** 408–410. **1091**

To determine the action of penicillin in varying concentrations on the survival of stored semen four samples were prepared as follows: semen diluted one in six with egg-yolk citrate, diluted semen plus penicillin and similar samples incubated at 37°C. for four hours.

Ten sets of four samples were prepared using concentrations of penicillin varying from 10,000 to 10 units per ml. and the percentage of motile spermatozoa and the type of motility were determined at daily intervals during storage. The results are given in tabular form.

The conclusion is that in high concentrations, *i.e.*, 10,000 to 4,000 units per ml., the penicillin suppresses motility by the third day and even more rapidly in the incubated sample. This suppression decreases as the concentration of added penicillin decreases until in the range 20 to 10 units per ml. the penicillin sample maintains its motility as long as the control and in the heated sample the survival time is increased by the addition of penicillin.—E. J. H. FORD.

PRINCE, P. W., & ALMQUIST, J. O. (1948.) **The effect of agitation upon the livability of bovine spermatozoa.**—*J. Dairy Sci.* **31.** 839–844. **1092**

Fifteen ejaculates from three bulls were each diluted with 24 parts of egg-yolk citrate solution. Diluted semen from each ejaculate was placed into four series of test tubes so that in each series there was a tube one-quarter, one-half and three-quarters filled and one full to the cork.

Three of these series were agitated at 76 oscillations per min. for periods of 6, 12 and 24 hours. A fourth series was not agitated. During agitation the tubes were maintained at a temperature of from 5–10°C. and afterwards at 5°C. for 20 days. An estimation of the percentage of motile spermatozoa was made before and after agitation and every two days thereafter.

Results are given in a table and examined statistically. It is concluded that incomplete filling of tubes as well as agitation has a harmful effect on the survival of spermatozoa, possibly due to the effects of the oxygen in the partially-filled tubes.—E. J. H. FORD.

BROWN, R. (1948.) **An accident associated with the use of an artificial vagina.**—*Cornell Vet.* **38.** 309–311. **1093**

The rubber band over the mouth of an artificial vagina of a commercial type which was missing after the apparatus had been used on a Swiss bull was found later looped twice around the penis at the base of the glans penis.—J. JONAS.

VALLE, J. R. (1947.) **Ovarian hyperemia in the immature rat as a pregnancy test in equids.**—*Proc. Soc. exp. Biol., N.Y.* **66.** 352–354. [Author's summary copied *verbatim.*] **1094**

The ovarian hyperemia reaction in immature rats was studied following the subcutaneous injection of equine serum from 38 mares and 4 female donkeys, 42–138 days after natural insemination. The accuracy of this 24-hour pregnancy test was 83%, failures being observed both by negative reaction in 4 pregnant cases and positive reaction in 3 non-pregnant ones.

STURKIE, P. D. (1946.) **A comparison of the gains in weight, fat deposition and market quality of estrogen-treated cockerels and capons.** —*Poult. Sci.* **25.** 531–533. **1095**

Eight Rhode Island Red cockerels seven and a half to eight and a half months old were given 25 mg. of dienoestrol subcutaneously followed by 25 mg. diethylstilboestrol subcutaneously 15 days later. Some birds received a further dose of 15 mg. diethylstilboestrol. After 38 days the birds

were killed and compared for meat qualities with control birds which had either received no treatment or which were caponized. The injected birds were as good as the capons in grading of carcasses, gain in bodyweight and amount of abdominal fat. In these respects the normal birds were inferior to both capons and injected birds, although the differences of gain in weight are barely significant [P = 0·075]. The weight of combs and testes of injected birds were approximately half those of normal birds. No significant difference in palatability was detected between the three groups. S. concluded that this treatment produced meat birds which compared favourably with capons.—R. J. FITZPATRICK.

BURKHARDT, J. (1947.) **Transition from anoestrus in the mare and the effects of artificial lighting.**—*J. agric. Sci.* **37.** 64–68. **1095**

Twelve barren pony mares, all in a state of deep anoestrus at the end of December, 1945, were used in the experiment. Four of the mares were kept in a loose-box, and were exposed to a 1,000-watt lamp every evening from Jan. 1st to Mar. 9th, 1946. The period of exposure varied from two hours at the beginning of the experiment to six and a half hours at the end. These mares came into oestrus on Feb. 7th, 15th, 23rd and Mar. 4th, respectively. Another group of four mares was kept in a loose box for four weeks, and the animals were treated, when hooded, with increasing doses of ultra-violet light, the flank and belly being irradiated. None of these mares came into oestrus during this period. Irradiation was discontinued on Feb. 1st, and a fairly high protein supplement was added to the diet until Mar. 10th. One of these mares, which was doubly wall-eyed, no pigment being present in either iris, came into oestrus on Feb. 27th, and the other three came into oestrus on Mar. 19th and April 18th and 21st respectively.

Two control mares left untreated in a loose-box until Feb. 20th came into oestrus on April 12th and 23rd and two control mares left in the paddock came into oestrus on April 10th and 25th.

Softening and growth of the ovarian stromal tissue was almost always detected some days before palpable follicles were present, and at or about this time, shedding of the coat was noted, and there was an increased vascularity of the cervix and vagina. The cervix lost its dry appearance, and as it enlarged it sank to the vaginal floor; this enlargement appears to be in direct response to the increased ovarian stromal tissue, as it may occur in the complete absence of palpable follicles. Follicular development followed the increase in size of the ovary, and ovulation either occurred naturally or could be brought about by the injection of pregnancy urine extract.—E. COTCHIN.

POLLAK, O. J. (1948.) **Azoospermia and aspermia.**—*Amer. J. clin. Path.* **18.** 542–547. **1097**

Azoospermia is defined as the absence of spermatozoa from the ejaculate. Earlier cells from the spermatogenic series are present. Aspermia is the condition in which elements of testicular origin are absent from the ejaculate which consists entirely of secretions from the accessory glands.

The various abnormalities which give rise to these conditions in man are discussed and illustrated by ten plates of testicle sections and a table indicating the type of ejaculate obtained from cases of developmental anomalies of the male reproductive tract.—E. J. H. FORD.

WHITTY, B. T. (1948.) **Some pathological conditions of the reproductive tract of the cow.**—*Irish Vet. J.* **2.** 166–182. **1098**

A broad survey of the abnormalities and pathological conditions affecting the reproductive tract of the cow.

The subject is dealt with on conventional lines; the conditions found in each organ from ovary to vagina being dealt with by reference to case records derived from abattoir specimens.

—E. J. H. FORD.

AZIZ-UD-DIN, I. M. (1948.) **The visual lesions in certain pathological conditions of the genital tract in cows.**—*Vet. Rec.* **60.** 345–347. **1099**

A detailed account of macroscopic and bacteriological examinations of uteri obtained from Ayr slaughter-house.

The uterine conditions encountered were catarrhal, necrotic and purulent endometritis, pyometra, tuberculous metritis, cystic degeneration and hydrometra.

In the fallopian tubes there were salpingitis (usually associated with uterine infection) and a cystic condition of the broad ligament which caused a crushing of the tubes. Cervicitis was primary or secondary to uterine infection, in the latter case being either acute or chronic. Pathological reports on the material are being prepared.

—E. J. H. FORD.

ROLLINSON, D. H. L., & HAQ, I. (1948.) **Mycotic infection of the prepuce of the bull.**—*Vet. Rec.* **60.** 69–70. **1100**

The authors review the literature dealing with mycotic infections of the reproductive tract of cattle, and describe investigations of the cause of infertility in a TB. and brucella-free Jersey herd. The bull, which had a pendulous abdomen and preputial catarrh, was slow at service and two cows, one of which was an imported cow, aborted at seven and eight months. There was no evidence of trichomoniasis but a mould, *Absidia corymbifera* was isolated from the bull's preputial washings and from the cervix of one of the cows. Three months

later the bull, on an improved diet, was serving normally and the infected cow was pregnant.

The authors consider that the mould was introduced by the imported cow, was transmitted venereally and was probably responsible for the abortions.—E. J. H. Ford.

Van der Kaay, F. C. (1949.) Sperma en aandoeningen van de accessoire geslachtsklieren. **[Semen and diseases of the accessory sex glands.]** —*Tijdschr. Diergeneesk.* **74.** 28–47. [English, French & German summaries. Abst. from English summary.] **1101**

The author describes the anatomy and physiology of the accessory sex glands and discusses the literature on divergences in these glands.

Two bulls which had a bilateral and a unilateral vesiculitis respectively are described. *Pseudomonas pyocyanea* was cultivated from the semen of the first bull and *Corynebacterium pyogenes* from that of the second. The quality of the semen of both bulls is described. The semen from which *Ps. pyocyanea* was cultivated proved to be much less altered than the semen containing *C. pyogenes*. The fertility of the semen of the first bull (infected with *Ps. aeruginosa*) was scarcely affected, while the fertility of the semen of the second bull (infected with *C. pyogenes*) decreased at an early stage in the infection.

Tuff, P. (1948.) To nye letalfaktorer hos storfe. **[Two new lethal factors in cattle.]**—*Skand. VetTidskr.* **38.** 379–395. [Abst. from English summary.] **1102**

A hereditary muscle contracture of the legs was established in nine calves at the Akershus Agricultural School. The calves were of the same type, born at term and several alive at birth. The legs were bent backwards and ankylosed, the hind legs in considerable degree. The hair was abnormally short and frizzy. The deformity is probably due to a single, recessive gene.

A hereditary paresis of the hind limbs, in most cases accompanied by blindness, was found in 24 Norwegian Red Poll calves. All were born alive and of normal size and appearance at birth, but the hind limbs were paralysed and the calves could not stand. Most of the calves had congenital spasm in the muscles of the neck, which caused them to throw the head and neck backwards.

Besides, several calves had continual muscular tremblings (*tremor musculorum*). At least 18 of the calves had *acute keratitis* and became blind. The cornea seemed to have been clear at birth, but became obscure in the course of three days and later turned white.

Heterozygous bulls mated to daughters of the bull Njål gave 105 calves, of which 90 were normal and 15 affected against the expected 92 : 13.

The disease is caused by a single, recessive, autosomal gene.

*See also absts.* **1037** and **1038** (hereditary osteopetrosis in rabbits); **1039** (abortions in cattle and sheep); **1059** (survival from birth to weaning of young pigs); **1073** (amino acids of semen); **1126** (pregnancy diagnosis tests); page 252 (Books recently received).

## ZOOTECHNY

Serebrenick, S. (1948.) Notas sôbre o clima do Brasil. **[The climate in Brazil.]**—*Bol. Minist. Agric., Rio de J.* **32.** No. 11. 13–46. **1003**

The climate of Brazil varies greatly throughout the country, but it is not characterized by great extremes. The mean temperature ranges from 16°C. in the South to 29°C. in the North, while the extremes are –10·1°C. (Palmas) and 43·8°C. (Rio Branco). The difference between the mean temperature of the hottest and of the coldest month (annual amplitude) increases directly with the latitude from 1°C. in the Amazon basin to 12°C. in Rio Grande in the South. Mean daily variations in the temperature range from 7°C. at the coast to 15°C. in the interior. High temperatures recorded remain within the bounds of comfort since the humidity is often low and the duration of the heat is cut short by the low night temperatures.

Regularly throughout the year, there come winds from the north, succeeded by the advent of cold polar air from the south. The effects of this are felt even beyond the equator.

Humidity varies greatly throughout the country, being highest in Acre territory and lowest in the northeast interior.

Rainfall varies from 3,000 mm. to 500 mm. annually. Around the coast, rain falls regularly throughout the year, while in the north the main rainfall is in the autumn. In the interior, maximum fall is in the summer.

Thunder is very common in Brazil, but hail is a very rare phenomenon. Snow is not uncommon, falling in the mountains mostly in June, July and August. Fogs occur frequently in some parts, sometimes up to 123 days in the year.

Generally speaking, the country can be divided into tropical and temperate zones of climate, and these may be divided on the basis of humidity into six and five sub-zones respectively.—I. W. J.

Phillips, R. W. (1948.) **Breeding livestock adapted to unfavorable environments.** pp. vi +182. Washington: F.A.O. Agricultural Studies No. 1. **1104**

This publication brings together in convenient form much scattered information and should be

of interest and value to all veterinary officers, more especially those in tropical and sub-tropical areas. Much of the literature on which the review is based dates from 1940 onwards.

Following a short introduction there is a useful chapter on the geographical and climatic influences which affect livestock. Then separate sections deal with sheep, cattle, horses and pigs, and a mixed section with buffaloes, yaks, reindeer, camels, llamas and alpacas.

The section on sheep is the longest and veterinary readers will be particularly interested in the information from Iceland which illustrates the danger of introducing disease when new types of stock are imported into an isolated community. Scab was introduced by Spanish sheep in the middle of the 18th century and again about the middle of the 19th century with disastrous results. As a result importation was discontinued until 1931, when special laws were passed to enable the government to import small numbers for experiments in improvement of the local sheep. Border Leicesters from Britain were introduced in 1931 and Karakuls from Germany in 1933. The German sheep, in spite of careful examination and quarantine, introduced Jaagziekte which spread very rapidly among the local sheep and caused heavy loss.

[Jaagziekte is wrongly described as epizootic "antenomatosis", a mistake which should be corrected in future editions. It is also stated that progressive pneumonia occurred in addition to jaagziekte. Many authorities would probably agree that progressive pneumonia and jaagziekte are different names for the same disease.]

A serious omission from the sheep section is any reference to the knowledge which has been gained in Australia as a result of the introduction of Merino and other types of sheep and the development from them of such excellent breeds as the Australian Merino, probably the greatest and most successful ecological experiment with sheep.

In the section on cattle there is a good account of the work on heat tolerance of Zebu as compared with European cattle by Rhoad and by Seath & Miller, and other workers in America. Kelly's work in Australia is summarized, as is experience from Jamaica, China, Ceylon, India and South Africa. There is a short account of the development of the Santa Gertrudis cattle in Texas.

The section dealing with horses and pigs is short and deals mainly with work done in America and China. The mixed section dealing with such less well-known types as the llama, alpaca, yak and reindeer is short, but contains information not readily available in many libraries; it makes interesting reading and will be useful for reference. The chapter on methods of breeding is a very useful review dealing with methods of selection, estimation of heritability, indexes of inbreeding, crossbreeding and the development of new breeds.

The improvement of livestock by amelioration of environmental conditions is not dealt with in any detail, as being outside the scope of the book.

—M. C.

BOSMAN, S. W. (1948.) **Climatological study on sheep in the Karroo.**—*Fmg S. Afr.* **23.** 169–182. **1105**

To compete successfully in the export market of mutton, it is necessary for South Africa to develop a system for the rearing of lambs that will be of high carcass quality. Experience has shown that high temperatures so disturb the metabolism of sheep that, even when diet is adequate, a large portion of the animal's energy is used for the regulation of its body temperature only, which means that the animal is virtually "starved". This defect associated with the South African climate has been satisfactorily overcome by provision of small portable, or larger permanent shelters to provide shade on hot days.—G. B. S. H.

MALMÉJAC, J., & GROSS, A. (1947.) Mécanisme de production de la lymphopénie observée en dépression barométrique. **[Mechanism of production of lymphopenia observed in barometric depression.]**—*C.R. Soc. Biol. Paris.* **141.** 394–395. **1106**

Normal rats under reduced barometric pressure develop a lymphopenia, a phenomenon which did not occur in adrenalectomized rats.

The authors consider that the hypersecretion of adrenalin which occurs under reduced barometric pressure exerts an indirect effect in association with the activity of the pituitary gland.

—J. A. J. VENN.

VON SCHIEREN, J. (1947.) Über den Identitäts- und Verwandtschaftsnach-weis beim Rind. **[Identification of cattle.]**—*Dtsch. tierärztl. Wschr.* **54.** 362–363. **1107**

Markings and points are usually too vague to be of much assistance in establishing the identity of cattle. In blood tests, it must not be forgotten that parentage can be excluded but not proved, and Landsteiner's law does not apply to bovine blood groups.

Muzzle prints, like human finger-prints, can be used for identification purposes. These prints have a definite and unchanging individuality throughout life. Hering took prints of 2,200 cattle, including many full and half sisters, and never found identical pictures. Hering's method of obtaining muzzle prints is described.

The author describes the three main patterns,

which have many variations. As the animal grows, the form and design of the prints become enlarged.

Blood tests, muzzle prints and morphological similarities may be used in combination for establishing relationship.—MARJORIE LATZKE.

VAUGH, M. (1945.) **Report on a detailed study of methods of yoking bullocks for agricultural work presented to the Imperial Council of Agricultural Research.**—*Indian J. vet. Sci.* **15.** 186–198. **1108**

These are preliminary observations, necessary before proceeding to a solution of the larger problem, *i.e.*, the effect of body conformation on the draught ability of work cattle. The importance of this problem in India where nearly 56 million work cattle are employed, need not be stressed. An improved method of working, even in small degree, would greatly increase the power available on the land. In the literature no tests of yokes or harness seem to have been reported, and little on the actual testing of animals for their draught power. The author gives an account of some different types of dynamometer.

For the purpose of experiment, data were obtained as to the types of yoke in use in different parts of the country. Of these 17 were selected for study. [These are illustrated.] The same five pairs of bullocks were used and the same driver. The animals were first accustomed to a new yoke before observations were recorded. In the first test each pair of bullocks was given 25 pulls with each yoke, and the work was repeated in a modified way in other tests. A certain number of tests with single bullocks were also made. The results are recorded in pounds pulled and are examined statistically. Since the information required in practice is the maximum load which a given animal can pull in ordinary kinds of work for ordinary work periods day after day, the results of the tests were recorded as maximum weight pulled. The ability to pull a given load might be determined by one of two factors, muscle strength and unit pressure under the yoke on the neck. In work of this kind there are a number of difficulties. One of the greatest is the periodically varying temperaments of the animals when given work to perform. Another is the amount of urging which the driver should be allowed to exercise. One endpoint that might be suggested in formulating results is fatigue, but unfortunately the state of fatigue cannot be easily determined in animals.

In spite of these difficulties many of the results obtained were reasonably consistent and enabled comparisons to be made. Some yokes were definitely better than others, but no single factor such as weight of yoke or area of contact with neck could explain their superiority. However, yokes which restrict side movement are undesirable.

—F. C. MINETT.

*See abst.* **1119** (hides and skins); page 252 (Books recently received).

## TECHNIQUE AND APPARATUS

INGELMAN, B., & LAURELL, H. (1947.) **The preparation of silicic acid jellies for the cultivation of microorganisms.**—*J. Bact.* **53.** 364–365. **1109**

Silica gels were easily prepared from orthosilicic acid tetramethyl ester $Si(OCH_3)_4$. This substance was, however, not readily obtainable and a detailed description is given of the preparation of gels for bacteriological purposes from orthosilicic acid tetraethyl ester $Si(OC_2H_5)_4$, a common industrial product.—A. MAYR-HARTING.

KAPLAN, A., TRAUM, J., & BANKOWSKI, R. A. (1948.) **Correlation of the radioactivity of suspensions of tubercle bacilli with their turbidity. Method of estimating weight in doses of tubercle bacilli.**—*Amer. Rev. Tuberc.* **58.** 102–111. [Authors' summary copied *verbatim.*] **1110**

A method is described by which the weight of radioactive tubercle bacilli in a suspension can be determined by measurements of their radioactivity. The relation between the weight of acid-fast bacilli in suspension and turbidity as measured by the photelometer, Gates opacimeter and McFarland nephelometer is presented. The photelometer provides a convenient and reasonably accurate method for estimating the weight of acid-fast bacilli in suspensions. Consistent results were obtained with three types of acid-fast bacilli, namely, *Mycobacterium phlei* and BCG and H37 strains of *Mycobacterium tuberculosis.*

FEINDEL, W. H., & ALLISON, A. C. (1948.) **Intravenous methylene blue for studying fiber degeneration in the central nervous system.**—*Science.* **107.** 429. **1111**

Rabbits were perfused intravenously with methylene blue five days after section of one optic nerve. Macroscopically and microscopically a clear contrast resulted between the normal and degenerating optic nerves. In addition to showing the histological changes of early degeneration, the degenerating fibres in paraffin sections stained a characteristic reddish-purple colour.—C. BRIGGS.

CARREA, R. M. E., REISSIG, M., & METTLER, F. A. (1948.) **Histological technic for cerebellar climbing and mossy fibers.**—*Stain Tech.* **23.** 65–68. [Authors' abstract copied *verbatim.*] **1112**

In order to avoid disadvantages attendant upon the use of fresh frozen sections, or of block impregnation with silver, in staining climbing or mossy fibers of the cerebellum, Rio Hortega's double impregnation method for nerve fibers is useful. This consists of prolonged formalin fixation prior to cutting frozen sections (which thereafter are easier to cut) and preliminary treatment with ammoniacal aqueous and alcoholic washes, mordanting in pyridine silver, and treatment with pyridine-silver-carbonate. Following this, sections are handled individually through one of several reduction methods after which they may be directly mounted or gold toned.

LONG, M. E. (1948.) **Differentiation of myofibrillae, reticular and collagenous fibrils in vertebrates.**—*Stain Tech.* **23.** 69–75. [Author's abst. copied *verbatim.*] **1113**

A procedure for the differentiation of the mesenchymal derivatives, myofibrillae, reticular and collagenous fibers is presented. Formol-Zenker fixation (5–12 hours) is followed by the washing, iodinization, dehydration and paraffin embedding steps routine for that fixative with the following modifications. Zirkle's butyl alcohol series is used for dehydration and infiltration with paraffin as well as in the alcohol slide series. Embedding paraffin used is Parawax plus 8–10% bayberry wax. Tissue-exposed surface of paraffin block is soaked in water overnight before cutting serial sections at 3–5$\mu$. Sections are mounted using the dilute albumen method, and the slides, thoroughly dried at 37°C. overnight, are left at 60° for 10 minutes to melt the paraffin of the sections. Before staining, the sections are given a preliminary treatment with potassium permanganate and oxalic acid. For reticular staining a 10% silver nitrate bath is succeeded by an ammoniacal silver carbonate solution followed by reduction in 1% neutral formalin, toning in gold chloride and fixing in sodium thiosulphate. Myofibrillae, the sacroplasmic limiting membrane and other sarcous elements are stained by Heidenhain's azocarmine solution, adult tissues at room temperature and fetal tissues at 50°C. Differentiation in phosphotungstic acid is followed by the staining of collagenous fibers. For adult tissue, light green SF (C.C.) is used and for fetal tissue, fast green FCF (C.C.). A discussion of the preparation of ammoniacal silver solutions is included. Both stock and used solutions of ammoniacal silver have been in use by the author for over a period of two years.

ARCADI, J. A. (1948.) **Impregnation of oligodendroglia in nervous tissue kept in formalin for many years.**—*Stain Tech.* **23.** 77–82. [Author's abst. copied *verbatim.*] **1114**

A method for impregnating oligodendroglia in nervous tissue (monkey) fixed and preserved in formalin for many years is described. This tissue is reconditioned by placing 12 to 30$\mu$ frozen sections of it in concentrated ammonia (sp. gr. 0·90) and by washing them slowly for 24 hours with a 1 mm. stream of water. The fluid is then poured off the sections; the jar is refilled with concentrated ammonia; and washing is repeated for another 24 hours. The sections are then plunged into concentrated ammonia for 7 minutes.

After treatment in ammonia, the sections are incubated for one hour at 38°C. in Globus' 5% hydrobromic acid solution. They are washed again, in distilled water, and then impregnated in a "medium" strength ammoniacal silver carbonate solution (5 ml. of 10% $AgNO_3$ added to 15 ml. of 5% $Na_2CO_3$. The precipitate is dissolved in concentrated ammonia and diluted to 50 ml. with distilled water). Impregnation is followed by reduction in 1% formalin without agitation; fixation in 5% $Na_2S_2O_3$; dehydration, and mounting in clarite.

Typical oligodendroglia were made visible by use of the method outlined in this paper.

BARER, R. (1947.) **Some applications of phase-contrast microscopy.**—*Quart. J. micr. Sci.* **88.** 491–500. **1115**

Using the phase-contrast method of microscopy, the transparent insect larvae *Chaoborus* and *Chironomus* were examined and it is stated that the living cells in the intact multicellular organism were observed with more clarity than was possible before. Contrary to general statement the phase-contrast method was found to be a valuable addition to the routine examination of stained sections. Phase-contrast illumination, rendered visible details of structure not properly stained by the Feulgen technique such as the cytoplasm and cell nuclei of a section of bone marrow, while with ordinary illumination only the cell nuclei were visible. When applied to Nissl stained nervous tissue, phase-contrast illumination made visible not only the nuclear structure but the unstained nerve fibre also.

Certain applications of phase-contrast microscopy require further study; this is especially true in the case of neurological material. The theory of the method is briefly described.—J. R. P.

PIJPER, A. (1947.) **Filming as a method of research in microbiology.**—Reprinted from *Antonie van Leeuwenhoek ned. Tijdschr. Hyg. Microbiol.* **12.** 26–32. [In English.] **1116**

P. states that the study of bacteria in the live state has been neglected and emphasizes the advantages to be gained from the use of cinemicrography as a method of study and research.

Three techniques are mentioned: "straight filming", *i.e.*, pictures both made and projected

at identical speed, usually 16 frames per second; the "time-lapse method", particularly suitable for slow processes, such as growth; and "slow motion filming", a method applicable to events which naturally take place at such speed that they cannot be followed and analysed by the human eye.

Among the examples cited to illustrate the value of cinemicrography in microbiology are the multiplication of bacteria and the demonstration of the nature of bacterial motility.—J. JONAS.

CRUICKSHANK, D. B. (1948.) **A risk associated with "Xylol vapour" immersion oil containers.**—*Mon. Bull. Min. Hlth publ. Hlth Lab. Serv.* **7.** 180–181. **1117**

With the double-jacketed container, the outer chamber containing xylol, in order "to maintain a moist atmosphere and prevent gumming-up" of the immersion oil in the inner chamber, the oil absorbs xylol to such an extent that its refractive properties are seriously affected. Further the lower lens of the immersion objective becomes loosened because of the solvent action of the affected oil. The manufacturers have agreed not to recommend this type of immersion oil container.
—NESTA DEAN.

*See also absts.* **888** (Dubos medium for TB.); **889** and **890** (cultivation of TB.); **1134** (a manual of clinical laboratory methods).

## MISCELLANEOUS

ANON. (1945.) Historisk överblick. [**Historical review of veterinary college affairs in Sweden.**] —*Svensk. Vet. Tidskr.* **50.** 183–193. **1118**

A general history of the development of veterinary education in Europe, leading to the development of the Stockholm veterinary college.
—F. E. W.

ROSE, P. D. (1946.) **The preparation of skins for the market. Part 2: Drying, storing and packing.**—*Fmg S. Afr.* **21.** 523–530. **1119**

Details are given of methods for drying, storing and packing sheep skins to avoid damage.

The methods are illustrated by excellent photographs and diagrams. Drying on a slatted platform in the shade is advised. Piling skins one on top of the other while awaiting despatch leads to damage by moths and beetles and to sweating of the skins. Cheap and practicable devices for hanging skins to avoid these troubles are described.
—M. C.

## REPORTS

INDIA. (1945.) **Annual report of the Imperial Council of Agricultural Research for 1944-45.** [RANDHAWA, M. S.] pp. 45. Delhi: Manager of Publications. [Rs. 2–2–0 or 3s. 6d.] **1120**

This is the 15th annual report of the Council's activities. A comprehensive plan for the development of Agriculture and Animal Husbandry in India was prepared. Of the seven chapters in the Report, five are mainly technical dealing with (1) Agricultural (Crop Husbandry) Research, (2) Sugarcane Research, (3) Animal Husbandry Research, (4) Combined Agriculture and Animal Husbandry Research, (5) Marketing.

Under (3) the matter is presented under the main headings of Breeding, Nutrition, Disease, Livestock Commodities. *Inter alia* the desirability is urged of propagating the type of animal best suited to each area of the country. Breeding operations were to be confined to specific breeds, as far as possible in their home tracts. The applicability of artificial insemination under Indian conditions was being studied. Schemes for improving the milk qualities of Kangayam cattle in Madras without impairing the draught qualities of the male were to be prompted. Proposals were made for opening herd books for certain Indian breeds and for reviewing milk-recording schemes. Sheep-breeding schemes were in progress in various parts of India. Cross-breeding with Merino, etc., were recommended only for limited areas, where climatic conditions were suitable. Angora goat-breeding was to be encouraged.

With regard to nutrition, it was proposed that research should be regionalized and Committees to study the problems were to be appointed in the three suggested regions of the country. Apart from this, four substations of the Central Institute were proposed.

With regard to disease, the Council's scheme for Disease Investigation Officers was extended for another five years, and the appointment of assistants to these officers was proposed for the special study of sheep and goat and of poultry problems. The technical programmes of the Disease Investigation Officers were reviewed by an *ad hoc* committee. Important findings were noted under the following schemes:–

TUBERCULOSIS and JOHNE'S DISEASE, ABORTION, STERILITY, RINDERPEST, FOOT AND MOUTH DISEASE, HELMINTHIASIS. Newcastle disease vaccine production centres were to be extended.

A number of schemes relating to dairying were recommended. Valuable information had been collected on the physical quality of varieties of Indian wool. Schemes for washing and grading wool were in operation. In connection with hides

and skins, a scheme for training of flayers had been extended. Other schemes concerned the control of ticks in Bombay and of the warble fly in Punjab.

A number of scientific monographs were being sponsored by the Council.

An Appendix gives a financial statement and shows how monies are allotted to various development schemes.—F. C. MINETT.

ANON. (1948.) **Veterinary Research in East and Central Africa. Proceedings of the Standing Veterinary Research Committee Conference: Kabete, 29th April-1st May, 1948.**—*E. Afr. agric. J.* **14.** 58–65. **1121**

A report of the last conference which would take place under these auspices, as the functions of the various Standing Research Committees were to be taken over by the East African Advisory Council for Agriculture, Animal Industry & Forestry. Summaries of the discussions of the various items on the agenda and the conclusions of the conference are given.

The RINDERPEST position in 1947 had been satisfactory, but staff and facilities were needed to enable Uganda and Kenya to extend immunization to the northern parts of their territories and control measures should be strengthened in the adjoining territories to the north. Methods of immunization were reviewed. It was agreed that goat virus was satisfactory except for breeds of high susceptibility and for young calves. Egg-adapted virus may be suitable for highly susceptible cattle, but difficulties were being encountered as strains were easily lost in the course of continued passage in eggs. Work was in hand at Kabete on a rabbit-adapted virus obtained from China. A study of the persistence of virus in carcasses was urgently necessary if export of meat in the future to Great Britain was to become possible.

Work in Uganda indicated that the severity of EAST COAST FEVER was related to the incidence of ticks and that highly susceptible cattle could resist exposure to small numbers of infected ticks. The age of the infecting tick was also related to the severity of the disease, the older the tick the milder the disease. Further research on species of *Theileria* other than *T. parva* was necessary to avoid confusion with true EAST COAST FEVER. High mortality in calves from EAST COAST FEVER could be greatly reduced by improvement in the standard of calf husbandry. Experiments with gammexane dips using a half-bath in which the cattle were submerged only up to dewlap has been made at Mpwapwa. Such dips were cheaper to construct and required less dip fluid. Good results had been obtained, but spraying of the ears was necessary and the dip fluid had to be frequently made up to strength of 64 p.p.m. of benzene-hexachloride. In other areas while good results were obtained at first it was found difficult to maintain the dips at adequate strength. Further research was necessary before such dips could be recommended for general field use.

In the treatment of TRYPANOSOMIASIS satisfactory results were reported from Kenya and Northern Rhodesia with phenanthridinium in doses of 1·5 mg. per kg. bodyweight. In Uganda some cases of delayed toxicity had occurred. In Tanganyika good results had also been obtained; skin lesions had occurred in one herd of cattle, but some factor other than the drug was thought to be involved.

A new drug prepared by Imperial Chemical Industries was undergoing trials in Kenya, Uganda and the Sudan. The importance of the carriage of tsetse flies by trains and lorries was stressed. Further knowledge on transmission by flies other than tsetse flies was required. Transmission of *T. vivax* by *Glossina palpalis* and by *G. pallidipes* was reported.

Work on development of immunity following subcurative doses of trypanocidal drugs was discussed. Wild fauna and game reserves in relation to livestock were considered and it was recommended that domestic stock should be excluded from game reserves, and that veterinary advice be sought regarding the siting of reserves and legislation controlling them. The high incidence of BOVINE TUBERCULOSIS in parts of Tanganyika required further investigation.

The existence of LUMPY SKIN DISEASE in South Africa necessitated the continuance of an embargo on import of cattle from the union to East Africa. Other subjects discussed included BOVINE CONTAGIOUS PLEURO-PNEUMONIA, *Corynebacterium ovis* INFECTION in sheep and BOVINE STERILITY.—M. C.

U.S.A. GEORGIA. (1944.) **University System of Georgia. Twenty-fourth Annual Report, 1943–1944, Georgia Coastal Plain Experiment Station, Tifton, Georgia.** pp. 112. Items of veterinary interest pp. 81–82 & 89. **1122**

During the gestation period the brood sows and gilts were carried as economically as possible, being fed off small grain crops while available or fed a ration of grain. The general practice was to feed 1 lb. daily of protein supplement containing 10% minerals to each animal.

Brood sows were bred 3–7 days after weaning the spring pig crop. During part of gestation the sows were fed on small grain crops with ½ lb. of protein supplement mixture consisting of 10 lb. tankage, 40 lb. soya bean meal, 40 lb. ground nut meal and 10 lb. mineral mixture, and for the rest of the period they were fed enough grain to keep

in good breeding condition. During suckling the sows were fed on "cattail" millet crops sown for them six weeks previously. An individual house was provided for each sow with about five houses in each lot. The sows were kept penned and fed a limited grain ration depending on their condition and after two weeks the sows and young pigs in one lot were allowed to run together. The sows were fed a full grain mixture twice a day in a pen away from the young pigs. At six weeks of age the young pigs were "double inoculated" against SWINE FEVER and the males castrated.

Pigs farrowed on cultivated land in 1943 to test the nutritive value of various field crops for feeding growing pigs during spring and summer were found P.M. to have on an average 700 worm parasites, an increase of about 27·9% on the previous year under similar conditions. There was an increase in all species, but NODULAR WORMS and THREAD WORMS accounted for a greater part of the increase. There were no LUNG WORMS present in the pigs in either year. The increase in other species is attributed to residual infection in the soil from the previous year.

Twelve pigs raised from weaning time on a paddock heavily contaminated with eggs or larvae of swine parasites consumed 23·15 lb. more food per 100 lb. of gain than 12 similar pigs kept on a relatively clean paddock from which manure was removed daily. NODULAR WORMS were eliminated from the 1943 autumn farrowed pigs by the treatment of the sows with phenothiazine prior to farrowing and the daily removal of manure from the farrowing paddock. The practice had been followed since August, 1941. The last lot of manure left on the soil in May, 1941, had been so infected. Larvae of NODULAR WORMS may survive in well-drained, unshaded, sandy loam soil in Georgia for from two to two and a half years.

Growing of a crop for ensilage on the winter grazing areas with the exclusion of animals from the area in summer had also helped to decrease the numbers of parasites infecting the pigs.

—J. A. GRIFFITHS.

U.S.A. GEORGIA. (1947.) **Twenty-seventh annual report, 1946-1947, Georgia Coastal Plain Experiment Station.** pp. 50. Items of Veterinary Interest pp. 37–41. **1123**

The effect of internal parasites on the growth and nutrition of pigs was reinvestigated and similar results obtained. Pigs farrowed and raised on soil heavily contaminated with the infective stages of internal parasites were severely stunted by the resulting worm infestation and did not reach their final market weight until five weeks later than pigs raised on clean soil and required 4·83 lb. of food to produce 1 lb. gain in live weight as compared to only 4 lb. per lb. gain in clean pigs.

Continued observation for the fifth year in succession of the parasitic infestation of pigs ranging over an area of occupied land revealed an increase in the average infestation of the pigs from 2,169 internal parasites to 4,187.

In a test carried out over a period of six years in which the manure was removed daily during the first ten weeks of the pigs' life, worm infection was reduced to 4·1 nodular worms and 11·5 thread worms per pig; liver lesions due to kidney worm larvae to 1·7 lesions per pig. The relative figures in the control pigs were 147·6, 21·9 and 3·6 respectively. This procedure also delayed maximum egg production of the large round worms by approximately 57 days.

1% sodium fluoride in the feed of pigs failed to remove all the large round worms.

An investigation on SUMMER ITCH of equines revealed the presence of microfilaria in the skin resembling those of the genus *Onchocerca*. No adult parasite was found in any infected animal. Tartar emetic in repeated intravenous doses of 0·66–0·88 g. in a 1% solution failed to cure the condition.

A new cattle disease, X DISEASE, had the appearance of MANGE externally and usually affected animals up to one year of age. In addition to the skin lesions, there was watering of the eyes, wart-like growths on the tongue, palate, lips and on some parts of the intestinal tract. There was diarrhoea. The animals became progressively thinner and died in a few weeks. Some animals had lesions around the top of the hoof. The disease had been mistaken for FOOT AND MOUTH DISEASE.

INFECTIOUS RHINITIS of swine, a chronic disease of the nasal passages transmitted by the sow to the young piglets. Symptoms were: dripping from the nose, snuffling and sneezing. Deviation of the snout to one side might result, causing great difficulty in breathing which retarded growth. Many pigs died and the disease spread slowly to a high percentage of pigs. The disease had been reported in Colquitt, Irwin and Turner Counties of Georgia, as well as from Indiana, Minnesota, New York and Canada. The only remedy was slaughter of all pigs on infected premises.

There was no fresh information on last year's report on MASTITIS control. Of 1,117 cows tested 19·7% were infected.—J. A. GRIFFITHS.

U.S.A. FLORIDA. (1946.) **University of Florida, Gainesville, Florida. Agricultural Experiment Station. Annual Report for the fiscal year ending June 30, 1946.** pp. 206+vi. Items of veterinary interest pp. 49, 51–56. **1124**

Where there was cobalt, copper and iron

deficiency in the pastures it was found that better results were obtained by feeding these minerals to cattle as a supplement than by constantly changing the pastures.

Analysis of data on length of useful life of 2,109 bulls showed that on an average their last calves were sired at 10·68 years. Owners disposed of 1,074 bulls while still fertile at an average of 6·24 years of age. Infectious diseases accounted for the death or disposal of 17·6%. Sterility from various causes accounted for 27·8%, accidents and injuries for 12·9%, old age for 9·7% and non-infectious diseases for 32%.

MINERAL NUTRITION PROBLEMS.—In experiments with laboratory animals it was established that cobalt is rapidly eliminated whether it is injected or given in food. The distribution of phosphorus to all parts of the body, including bone, is very rapid and suggests the possibility of a more rapid change in bone composition than was previously suspected.

Research with penicillin showed the efficacy of this preparation against MASTITIS streptococci, but the MASTITIS staphylococci were less susceptible, although they were destroyed by large doses. *Bact. coli* type micro-organisms in the udder were more difficult to destroy with penicillin, but in large doses it appeared to be effective. The doses recommended were 25,000–100,000 units in 1–2 oz. of sterile distilled water, injected into each teat every 24 hours.

In tests of the longevity of eggs of the internal parasites of cattle it was found that the larvae of the following parasites could not withstand a starvation period of 10–19 months on carpet grass pasture: *Haemonchus contortus* and *H. similis*, *Ostertagia ostertagi*, *Trichostrongylus axei*, *Cooperia spp.*, *Oesophagostomum radiatum*, *Trichuris discolor*, *Bunostomum phlebotomum*, *Dictyocaulus viviparus* and *Nematodirus filicollis*. All these parasites remained infective on the pasture for six and a half months.

The treatment of soil with sulphur at the rate of 10 lb. per 100 square feet was found to destroy coccidia and the common round worm eggs. The hydrogen-ion concentration of the soil reaches a pH of approximately 3–4 within three months of the initial dusting with sulphur.

A mixed herd of 200 cattle, proved by microscopic examination of faeces to be infected with *Fasciola hepatica*, were treated with hexachlorethane-bentonite suspension in water. Doses ranged from 10–20 g. per 100 lb. bodyweight. The drug was shown to be effective for destroying FLUKES in the liver at the time of treatment, especially if there were no calcareous changes in the bile ducts. With the larger doses there was evidence of toxicity of several days' duration, but definite improvement in condition and appearance occurred after treatment.

Losses from FLUKE INFESTATION had occurred in nine counties. A pasture area had been obtained to test agents for the control of liver fluke. The eggs of *F. hepatica* recovered from the gall bladder of infested cattle were hatched out under laboratory conditions in 11–12 days.

Earlier work on the usefulness of 2–2·5% water dispersable D.D.T. for spraying cattle was confirmed for controlling HORN FLIES. Further work will be necessary to work out a practical method for controlling TICKS infesting cattle by this means.

A SKIN DISEASE known as "LEECHES" had been investigated in eight infected horses. All specimens examined yielded at least one common fungus. A method for the isolation of the fungus had been perfected. The disease had not yet been reproduced in a healthy horse with the organism isolated.

HYPODERMA LINEATA INFECTION was becoming a great menace. Control measures were being enforced. No details are given of the composition of the washes, dips or sprays used.—J. A. G.

ANON. (1947.) Direccion de ganaderia. Memoria anual de 1947. **[Annual report (1947) Livestock Dept. (Uruguay).]**—*Bol. mens. Direcc. Ganad., Montevideo.* **29.** pp. 8. Items of veterinary interest I, VII, IX, X & XI. **1125**

I. In order to eradicate sheep SCAB, modification of existing legislation was required. A project for the new legislation was before the Senate of Uruguay.

During 1947 the number of sheep farms isolated on account of SCAB was 1,861, while 2,225 farms had been declared free from infection. The number of fines imposed for offences against the SCAB control regulations was 3,198 (a total sum of $82,298).

VII. The first congress on BRUCELLOSIS took place in Montevideo in Dec., 1947, and was attended by veterinarians from Uruguay and other countries and also by zootechnicians employed under the Ministry of Agriculture. Among the resolutions carried was one which stressed the necessity for adopting proper control methods.

IX. FOOT AND MOUTH DISEASE had appeared only in the form of isolated small outbreaks of a mild nature and was not considered a cause for anxiety.

X. A notable decrease in the incidence of SWINE FEVER had been observed. Continued use of swine fever serum and of crystal violet vaccine on numerous animals had been a factor in control.

XI. Sales of vaccine for use against ANTHRAX had been 1,568,795 doses and for use against BLACKLEG 585,124 doses. Although these figures

were far below the number of vaccinations needed to eliminate the occurrence of cases of ANTHRAX in human beings and to protect the interests of cattle breeders, the number of animals vaccinated was comparable to the figures for previous years.

Seventeen farms had been quarantined on account of ANTHRAX in 1947, and three on account of BLACKLEG.—F. E. W.

## BOOK REVIEWS

COWIE, A. T. [B.Sc., M.R.C.V.S., Ph.D.]. (1948.) **Pregnancy diagnosis tests : a review.** pp. 283. Aberystwyth, Wales : Commonwealth Agricultural Bureaux. Joint Publication No. 13. 15s. **1126**

A convenient book of reference to the various tests which have been proposed for the diagnosis of pregnancy both in women and domestic animals is long overdue and the author has performed a most useful service in reviewing all the more important papers on the subject, some 2,000 references being dealt with.

For the purpose of the review, the pregnancy tests have been divided into seven classes, *i.e.*, clinical, hormonal, enzymic, biochemical, physiological, immunological and physical, the different species being considered separately under each heading.

In spite of the great variety of tests proposed, it is clear that in domestic animals the laboratory diagnosis of pregnancy is almost entirely limited to the mare and in this case only the detection of gonadotropins in the blood and oestrogens in the urine are of value. Consequently, a little more detail as to the best methods for recognizing these substances might possibly have been included in the text and it should be made clear that Cuboni's reaction is not specific for oestrogens. However, the author has given a clear enough picture of the present state of knowledge from the mass of material which has accumulated on the subject and the book will be found to be of the greatest value to all those engaged upon the diagnosis of pregnancy.—J. A. NICHOLSON.

CALMETTE, A., BOQUET, A., & NEGRE, L. (1948.) Manuel Technique de Microbiologie et de Sérologie. [**Technical manual of microbiology and serology.**] pp. 727. 4th Edit. Paris : Masson & Co. **1127**

This is a greatly enlarged edition of Calmette's text-book designed as a laboratory workers' *vade-mecum*.

It is divided into nine sections dealing respectively with : General laboratory methods ; Techniques for use in morbid anatomy and haematology ; Bacteriological culture media and methods ; General information of a theoretical nature concerning bacteriology, chemistry and mathematics, as applied to the two former subjects ; Special methods in the study of disease in man and animals ; Serological reactions ; Analysis of air, water, soil and milk ; Preparation and standardization of vaccines.

The style is, in the main, lucid and concise. There is an adequate index. The addition of references, if only to key works on particular subjects, would have been of value.—J. A. J. VENN.

VAN THIEL, P. H. [Professor of Parasitology of the University and the Institute of Tropical Medicine at Leyden]. (1948.) **The leptospiroses.** pp. x + 231. Leiden : Universitaire Pers Leiden. [In English.] **1128**

The author classifies the leptospira as subgenera of the genus spirochaeta, grouping them together with *Treponema* and *Borrelia*. The general biology of the parasites is dealt with briefly. The section on laboratory methods and technique, including the demonstration of leptospira in the body fluids, the diagnostic serological methods, the methods of cultivation, and the use of experimental animals, is excellent. Korthof's culture medium (1932) is said to give the best results.

The epidemiology and pathogenesis of leptospirosis are discussed at length, detailed attention being paid to the animal vectors of the parasites. The dog, for example, in different parts of the world, may act as a carrier for seven specific forms of leptospirosis.

The author rightly considers that the value of penicillin in the treatment of the leptospiroses is doubtful. The best treatment is undoubtedly specific anti-serum.

The 13 specific forms of leptospirosis are concisely dealt with in a series of short annotations.

The book is well set out and there is an extensive bibliography. It will be of the greatest use to laboratory workers, but there is much to interest the general practitioner.—A. R. JENNINGS.

ESPE, D. [Professor of Dairy Husbandry, North Dakota Agricultural College]. (1948.) **Secretion of milk.** pp. viii + 320. Ames, Iowa : The Iowa State College Press. 3rd Edit. $3.75. **1129**

This is a reprint of the third edition (1946). This gives a clear indication of how firmly established this book has become since it was first published in 1938. The arrangement of the material has been little altered from previous editions (see *V.B.* **10.** 226, & **13.** 152). The text has been brought up to date and all the valuable features have been retained, the anatomical, physiological and nutritional factors influenc-

ing the mammary gland being dealt with as well as sufficient general physiology to form a clear picture of mammary activity in relation to the rest of the body.

Recent work on milk secretion has mainly turned on the hormonal control of the mammary gland. This the author reviews in detail and indicates clearly the dangers of transferring results obtained with one species to another. The important point is brought out that proper nutrition rather than endocrine administration has the greater influence on normal milk secretion.

The efficient production of milk is of such importance that this book should be in the hands not only of students and teachers, for whom it is primarily intended, but also practitioners and others who are concerned with the practical problems of milk production.—J. A. NICHOLSON.

KOCH, S. O. (1947.) Undersøgelser over Udbredelsen af de ved Maelkekontrol konstaterede Tilfaelde af klinisk paaviselig Mastitis deres Forløb og Aetiologi. **[The distribution of cases of clinically demonstrable mastitis notified by the milk control authorities (Denmark); their history and aetiology.]** pp. 334. Copenhagen: A/S Carl Fr. Mortensen. **1130**

This is a report of a very comprehensive study on the natural history of mastitis in cows in Denmark. The Milk Control Service records of 1,301 herds were followed for five years, those of 66 herds for three years and those of 95 herds for two and a half years. About 10,000 cows were examined monthly in the Service and the average number of cows per herd was slightly under ten.

Study was made by noting the number of new cases of mastitis occurring month by month and in this way the progress of infection could be followed. The highest number of cases observed in any month amounted to 12·7% of all the cows. This figure is obtained from the records made soon after an infection of the district by foot and mouth disease and there was clear evidence that this disease predisposes to mastitis. In the absence of foot and mouth disease the usual average figure was between 5% and 6%. In the case of a large group of herds it was found that over a period of four and a half years 41% of all the cows had been affected at one time or another by mastitis and only 8·5% of the herds had been free from infection over the whole period. Most of these mastitis-free herds were very small ones with not more than five cows in each. There was no herd with 20 cows or more which escaped infection. Records of this sort are given in lavish detail and constitute the bulk of the book and a study of these records shows the influence of new infections, relapses and elimination of infection through sale of affected cows. Estimates are also made of the amount of milk lost through mastitis and of its value.

It was found that a hind quarter was the first to become infected in about two-thirds of all cases. Streptococci were present in 59% of samples of infected milk and streptococci + staphylococci in 3·8%, whilst staphylococci were found alone 28%, "pyogenes bacteria" in 2·2%, *Bact. coli* in 1% and corynebacteria in 1%. Of the streptococci isolated, 234 strains were *Str. agalactiae*, 38 *Str. dysgalactiae* and 44 *Str. uberis*.—J. E.

TURNER, C. D. [Ph.D., Associate Professor of Zoology at Northwestern University.] (1948.) **General endocrinology.** pp. xii + 604. London: W. B. Saunders Co. 35s. **1131**

Text-books in the past have presented endocrinology mainly as a medical speciality. The rapid advance in the field of endocrine research during the last 20 years, however, has led to the emergence of endocrinology as a fully-fledged basic and clinical science. In view of this, the author considers that endocrinology should also be presented as a fundamental aspect of biology and he has achieved this object well. The wide scope of the book may be partly appreciated from an enumeration of the chapter headings :– Introduction, Biology of Secretion, Thyroid Gland, Parathyroid Glands, Pancreas, Gastrointestinal Principles, Adrenal Glands, Biology of Sex and Reproduction, Physiology of the Testis, Physiology of the Ovary, Hormones in Pregnancy and Lactation, Pituitary Gland, and Endocrine Mechanisms in the Invertebrates. The subject has been treated with great skill, masses of widely scattered data on endocrine mechanisms in vertebrates, invertebrates and plants have been carefully and concisely reviewed, and controversial questions assessed objectively and fairly. The text is illustrated with numerous excellent drawings, a large number of which are original. The hackneyed photographs of cases of endocrine dysfunction, which reappear with monotonous frequency in many books dealing with endocrinology, have been omitted. This omission is in keeping with the nature of the book and with Long's recent remarks on the "emergence of endocrinology from the world of giants, dwarfs, bearded ladies and other oddities [illegible] with which it has for so long been identified."

While written primarily for biologists, this book, on account of its wide and liberal treatment of the subject, will be read with great interest by specialists as well as by non-specialists, and since each chapter is provided with a comprehensive list of references, some 1,500 in all, the book is a valuable work of reference. It can be recommended without reservation to veterinarians and workers in allied fields as an up-to-date, accurate

and interesting text-book and reference book on endocrinology. It may be pointed out that the book does not contain much information on specialized endocrine techniques such as the use of gonadotropins for twinning in sheep or the hormonal stimulation of lactation, but such matters are already dealt with in specialist reviews and their omission is of little consequence since it is generally on more simple and fundamental matters that the clinician desires guidance and information.

The book is well produced, the printing is of high quality and misprints are negligible. On page 335, however, the "D" ring of the formula for testosterone is incorrectly depicted as a six-membered ring.

This book is a valuable contribution to the field of endocrinology, and undoubtedly reflects the present status and trends in this new science. The author may indeed feel well satisfied with his efforts.—ALFRED T. COWIE.

FOOT, N. C. [M.D., Professor of Surgical Pathology, Cornell University Medical College; Surgical Pathologist to New York Hospital]. (1948.) **Identification of tumors.** pp. xxi + 397. London: J. B. Lippincott Co. 42s. **1132**

In the preface, in which he explains why he wrote this book, the author states that he has often been asked by medical students and young physicians and surgeons, "Where can I find out about a certain tumor without having to search through a long treatise on neoplasms or an even thicker book on general pathology?". The difficulty he found in answering this question, and the fact that for amateur naturalists there exist "pocket guides" to birds, trees, flowers, and so on, suggested to the author that there was a need for a book rather on these lines, to be used as a "ready reference" or "brief guide" to the identification of tumours. The book thus appears to be intended for the beginner in human oncology. To this extent, therefore, it will be of limited interest to the veterinary pathologist interested in tumours. Those requiring detailed information on human tumours, will turn rather to such text-books as that by EWING, or to the recent important work by WILLIS.

In this book, which is concerned only with human neoplasms, the author deals first with tumours of general distribution (fibromas, lipomas, and so forth) and then with those occurring in particular organs or systems, giving, for each tumour, brief notes on some or all of the following features: name or names; source of origin; site; age and sex of patient; important associated signs and symptoms; gross and microscopic features that might assist diagnosis; differential diagnosis (indicating in some cases staining methods); prognosis, metastasis; name of corresponding benign or malignant tumour. Most of the tumours mentioned are illustrated in photomicrographs, of which the magnification is usually not stated.

At the end of the book is a short chapter on recommended fixatives and stains, and then a "Tabular locator for tentative identification of neoplasms" which lists the neoplasms described and tabulates briefly certain information about them that might provide a tentative diagnosis. Having identified a given tumour by the use of this book, the reader can then look it up in the index of a "larger and more comprehensive text-book and 'read all about it'". Few references to the literature are given.—E. COTCHIN.

KELLY, E. C. [M.D., F.A.C.S., Associate Professor of Surgery, Albany Medical College]. (1948.) **Encyclopedia of medical sources.** pp. v + 476. Baltimore: The Williams & Wilkins Co.; London: Baillière, Tindall & Cox. $7.50 (41s.). **1133**

Impressed by the difficulty he had experienced on occasion in finding the correct references to original work, the author undertook the task of collecting references to medical eponyms and original work. He has listed over 5,000 names and under each name gives the correct reference to any original work associated with that name or to any test, operation, method, syndrome, culture medium, etc., which is generally known by that name. For example, under the name Fleming, Sir Alexander, the references to his method for titration of penicillin, his test for diagnosis of syphilis and his discovery of lysozyme are given. There is also a subject index which gives names of the original workers under each particular subject.

The work will be of value to medical librarians and research workers. To veterinary workers it will be disappointing; on first glancing through its pages one gets the impression that it deals solely with human medicine, but some purely veterinary matters are included. For example, hog cholera is in the subject index with one reference, namely to Dorset's work on immunization; Theobald Smith's name is included with references to his work on Texas fever and bovine tuberculosis. Bang, described as a "Copenhagen physician" is included with reference to his system for eradication of bovine tuberculosis. One looks in vain for such names as Sir J. McFadyean and Sir Arnold Theiler. The name Theiler does appear, but is that of Sir Arnold's Son, Max Theiler, who is described as a "Boston scientist". Under trypanosomiasis in the subject index many names are given, but not those of Griffith Evans and Bruce. Castellani is included,

but he is described as an "Anglo-Indian", a curious mistake as he is not English and he never worked in India. Foot and mouth disease is included in the subject index, but there is only one reference, namely to Loeffler.

Errors and omissions such as these reduce the value of the book in so far as veterinary science is concerned.—M. C.

TODD, J. C. [Ph.B., M.D., Late Professor of Clinical Pathology, University of Colorado School of Medicine], & SANFORD, A. H. [A.M., M.D., Professor of Clinical Pathology, Mayo Foundation, University of Minnesota]. (1948.) **Clinical diagnosis by laboratory methods. A working manual of clinical pathology.** pp. xi + 954. Numerous figs., 44 tables. Philadelphia & London: W. B. Saunders Company. 11th Edit. 37s. 6d. **1134**

The book is divided into 21 chapters dealing with :– the microscope; sputum; urine; blood; clinical chemistry; gastric and duodenal contents, faeces, animal parasites; pus, puncture fluids and animal inoculation; nose, mouth, pharynx, ear and eye; viruses and rickettsias; bacteriological methods; milk and water; serological methods; medical mycology; vaccines; antibiotics; biological skin tests; and semen and hormones.

There is an appendix dealing with the preparation of reagents and containing tables and also an Index-Outline of laboratory findings in important diseases.

The scope of the book is, therefore, comprehensive. It is a work of reference that any laboratory worker would wish to have at hand. It is profusely illustrated (397 figures).

WILLIUS, F. A. [M.D., M.S. in Med., Senior Consultant in Cardiology, Mayo Clinic], & DRY, T. J. [M.A., M.B., CH.B., M.S. in Med., Consultant, Section on Cardiology, Mayo Clinic]. (1948.) **A history of the heart and the circulation.** pp. xvii + 456. London: W. B. Saunders Co. 40s. **1135**

This book on the heart and circulation covering the period 3000 B.C. to A.D. 1925 is written by two physicians. There are those who believe that historical documentation is the preserve of the professional historian, but the authors counter this, in this instance, on the grounds that professional historians have so far failed to produce a comprehensive work and that the medical historian is more qualified to interpret medical data.

It is certainly true that the historically-minded physician will better appreciate the story from medical historians; and the chronological presentation, in which one is taken from the "vital spirits" and invisible interventricular pores of Galen to the problems which beset workers in the post-Harverian era, or from the description of "angina pectoris" recorded by Seneca, a philosopher, in the first century A.D. to the views of Clifford Allbutt, provides most excellent reference material. The chronology is divided into period sections and deals also with sociological factors influencing the workers in varying eras. The more recent periods, 18th to the first quarter of the 20th century, receive the greatest attention and this can perhaps be attributed to the rise of clinical pathology and improvements in technique which the authors have to record.

The second half of the book is devoted to special biographies of those who have contributed much to our knowledge of the cardio-vascular system and its diseases, among which are noted the Arabian physician Ibn an-Nafis, for whom a claim to be the first to record the pulmonary circuit cannot be disputed, Marcello Malpighi and Sir Thomas Lewis. The authors conclude with a further chronological presentation of data according to subjects, chiefly pathological, which is probably the most comprehensive of its kind.

There can be little of historical importance on the heart and circulation that cannot be traced through the pages of this book.—C. W. OTTAWAY.

MCDONALD, E. [Edited by] [Director Biochemical Research Foundation, Newark, Delaware]. (1947.) **Neutron effects on animals.** pp. 198. Baltimore: Williams & Wilkins Company. **1136**

The rapid advance in the production of atomic energy and the possibility of its industrial application has made it essential to study the effect of radiation on living cells. Whilst there are many kinds of radiation produced by such agents as visible light, ultra-violet light, X-rays, $\gamma$-rays, neutrons, etc., each requires separate study since, although the end result may be similar, the mechanism of their action is quite distinct. It would seem that the chief harmful radiation produced by atomic fission is due to the release of those uncharged particles known as neutrons and this book contains a collection of papers by various authors describing the production and effect of neutrons on living tissue, care being taken to exclude any other form of radiation.

The neutrons were produced by a cyclotron and dogs, rabbits, and rats were mainly used for the experiments. The gross effects were loss of appetite, loss of weight and death in from six days to two weeks depending on dosage. Pathological changes were most marked in immature and dividing cells particularly in the testis, lymph tissue and white blood corpuscles. The latter become greatly reduced in numbers and may even be made to disappear altogether from the blood. It would seem that the most likely cause of the observed effects is a failure of cell division, so

that cells with a short life rapidly die out as they cannot reproduce themselves.

Whilst this book may be primarily intended for the specialist, it is also of general interest, forming as it does an excellent introduction to the pathology of the atomic age.—J. A. NICHOLSON.

BAITSELL, G. A. [Edited by]. (1947.) **Science in progress.** pp. xv + 353. New Haven: Yale University Press; London: Geoffrey Cumberlege. 5th Series. $5.00 (27s. 6d.). **1137**

Reports of recent studies by ten contributors on widely different subjects are presented; of special veterinary interest are those by Heidelberger, entitled "Complement": Immunity Intensifier, Diagnostic Drudge, Chemical Curiosity; by Rous, entitled "Concerning the Cancer Problem"; by Speidel, entitled "Living Cells in Action"; and by Evans, entitled "Recent Advances in Our Knowledge of the Anterior Pituitary Hormones." Other papers of veterinary interest deal with "Genes and the Chemistry of the Organism", "Contact Catalysis" and "Fundamentals of Oxidation and Respiration". In an introduction Jewett discusses the effect of war on fundamental and applied research and scientific manpower.

The book is excellently printed and well illustrated.—M. C.

STILES, K. A. [M.S., Ph.D., Professor of Biological Science, Michigan State College]. (1946.) **Handbook of microscopic characteristics of tissues and organs.** pp. x + 214. Philadelphia: The Blakiston Company. 3rd Edit. **1138**

This is one of the books which we are now so accustomed to see from the U.S.A. with perforated leaves mounted on rings so that the sheets open flat. They are printed on only one side, and some blank pages have been inserted. These and the blank sides of the printed pages serve for notes.

The book is written for use as a supplement to a regular textbook on histology. There are a dozen or two diagrams and there are nine sets of tables giving essential feature systems, epithelial tissues, blood, vascular system, lymphoid organs, digestive system, respiratory system, urinary system and the male and female reproductive systems.

The printing is clear and on good quality paper.

ALLMAN, R. T., & HAMILTON, T. S. (1948.) **Nutritional deficiencies in livestock.** pp. iv + 101. Washington: F.A.O.; London: H.M. Stationery Office. $1.00. **1139**

Starting with the statement that the chief factors, in order of their importance, in limiting the world's production of meat, milk and eggs are first, insufficient food, second, insufficient concentration in the ration of one or more dietary essentials, and third, severe dietary deficiencies, the authors proceed to discuss the relation of the soil to nutrition; the toxicity of excess food constituents; losses due to improper feeding; wastage of food caused by unbalanced rations; and then to a description of the symptoms of nutritional deficiencies in dairy cattle, pigs, poultry, beef cattle, sheep, horses, mules, and finally, goats. A separate chapter is devoted to each of these types of food-producing animals.

In a short chapter on the soil, the interplay of climate, plants and soil as expressed in the mineral content of the herbage is illustrated diagrammatically and a map of the world indicates those areas in which nutritional deficiencies in livestock, arising out of mineral deficiencies in the soil, have been recognized. The table showing relationships of soil and nutritional deficiencies from Technical Communication No. 15, Imperial Bureau of Animal Nutrition (1944) by RUSSELL is reproduced.

The chapter on toxicity of excess food constituents is short and deals with fluorine, selenium, molybdenum, nitrites and saline waters. Dealing with molybdenum it is stated that "an excess of molybdenum apparently decreases the availability of cobalt according to an investigation of this problem in England". No reference is given to support the statement; possibly it is a misunderstanding of the findings of MITCHELL *et al.* (1941) that top dressing pasture with large dressings of cobalt (80 lb. per acre) increased the molybdenum content from 6–14 p.p.m. There is certainly no evidence available at present from the "teart" areas in England that excess molybdenum is associated with cobalt deficiency.

The chapters dealing with the symptoms of specific deficiencies in the various types of livestock are somewhat uneven, that dealing with poultry being the longest and most complete especially as regards the experimental avitaminoses. Only six pages are devoted to pigs and two of these are occupied by photographs; there is also a table summarizing the symptoms which characterize certain deficiencies. Horses and mules are dealt with in four pages and a table of dietary requirements. Discussing calcium and phosphorus requirements of horses, the terms osteomalacia and osteodystrophia fibrosa are used as if they were synonymous and no reference is made to the work of Theiler and his associates. In the chapter on dairy cattle the danger of a sodium chloride deficiency is somewhat exaggerated and must be based entirely on laboratory observations. In the account of phosphorus deficiency, depraved

appetite manifested by the chewing of such things as wood, hair, rags, bones, etc., is stated to be a symptom, but the specific diagnostic importance of osteophagia is not stressed, nor is mention made of the serious decrease in fertility which is such a feature of aphosphorosis in South Africa. The "most distinguishing feature" of copper deficiency is stated to be anaemia, a statement which is not in accordance with the findings of Australasian, Dutch and British workers.

In the chapter on beef cattle, the specific craving for bones manifested in aphosphorosis is mentioned, although as stated above, it is not stressed in the chapter on dairy cattle. Ostitis fibrosa, osteoporosis, osteomalacia and rickets are all listed as bone lesions which occur in cattle on a phosphorus deficient diet, but again there is no mention of decreased fertility. The chapter on sheep is disappointing. Enzootic ataxia of Australasia is described, but is not correlated with the similar condition "swayback" which occurs in Great Britain in lambs born to ewes having a low copper status but grazing on pastures which have a normal copper content. There is no mention of the changes in the wool which are regarded as diagnostic of copper deficiency in Merino sheep.

At the end of each chapter there is a short list of references, mainly to American publications, and there are numerous good illustrations.

As a semi-popular account of the importance of the nutritional diseases, it has its value, but the research worker will find much to criticize. The practical stock feeder will find the tables of recommended nutrient allowances too academic to apply in practice and those interested in mineral deficiencies will find that little or nothing is added to Russell's 1944 review of the subject.

The book as a whole shows evidence of hasty preparation.—M. C.

*See also abstr.* **929** (the bacterial cell and its relation to problems of virulence, immunity and chemotherapy); **1032** (comparative neuropathology of mammals); **1104** (breeding livestock adapted to unfavourable environments).

## BOOKS RECENTLY RECEIVED

[Notice of recently received books in this list does not preclude review.]

BESSIS, M. (1948.) Cytologie sanguine normale et pathologique. [**Normal and pathological haemocytology.**] pp. 298. Paris: Masson et Cie. Fr. 1,500.

Deals with technique and with normal and pathological haematology in man.

DOUTRESOULLE, G. (1947.) L'élevage en Afrique Occidentale Française. [**Livestock breeding in French West Africa.**] pp. 298. Paris: Larose, 11 rue Victor-Cousin.

EHRLICH, C. (1948.) Die Aufzuchtkrankheiten der Jungtiere. [**Disease of young animals.**] pp. 136. Hiltrup bei Münster i.W.: Landwirtschaftsverlag G.M.B.H.

FANCONI, G., & LÖFFLER, W. (1948.) Streptomycin und Tuberkulose. [**Streptomycin and tuberculosis.**] pp. 357. Basel: Benno Schwabe & Co. Swiss Fr. 30.

GALLI, A. (1948.) Pagine di ostetricia e ginecologia veterinaria. [**Veterinary obstetrics.**] pp. 186. Pisa, Roma: Vallerini Editore.

DE JUVIGNY, C. (1947.) Assurance mortalité des animaux. (Chevaux et bovins.) [**Insurance of domestic animals (horses and cattle).**] pp. 342. Versailles: Editions de L'Observateur.

KINSELLA, V. J. [M.B., Ch.M. (Syd.), F.R.C.S. (Eng.), F.R.A.C.S.]. (1948.) **The mechanism of abdominal pain.** pp. 230. Sydney: Australasian Medical Publishing Co., Ltd.

LESBOUYRIES, G. (1949.) Reproduction des mammifères domestiques. [**Reproduction in domestic mammals.**] pp. x + 712. Paris: Vigot Frères.

Deals with the anatomy and physiology of the genital system.

MELCHERS, W. J., & GERRITSEN, H. J. (1944.) Koper als onmisbaar element voor plant en dier. [**Copper as an indispensable element for plants and animals.**] pp. 56. Wageningen: N. V. Drukkerij "Vada", Gebr. Zomer en Keuning. F. 1.90.

NICOLAS, E., & BRION, A. (1949.) Vade-Mecum du vétérinaire. [**The veterinarian's vade-mecum.**] 8th Edit. Paris: Vigot Frères. pp. xx + 754.

SCHUBERT, G. (1948.) Kernphysik und Medizin. [**Nuclear physics and medicine.**] pp. 354. Göttingen: "Muster-Schmidt" K.G. 2nd enlarged edition.

ZIETZSCHMANN, O., & NICKEL, R. (1947.) Leitfaden der Anatomie der Haustiere. [**Guide to the anatomy of domestic animals.**] pp. 112. Wolfenbüttel-Hannover: Wolfenbütteler Verlagsanstalt, K.G.

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